[4619] - 1

F.Y. B.Sc.

BIOTECHNOLOGY

Bb - 101 : Fundamentals of Chemistry

(2008 Pattern)

Time : 3 Hours]   *[Max. Marks : 80*

Instructions :

  1)   *Neat diagrams must be drawn wherever necessary.*

  2)   *Figures to the right indicate full marks.*

  3)   *Use of logarithmic tables slide rule, Mollier charts, electronic pocket calculator and steam tables is allowed.*

  4)   *All questions are compulsory.*

  5)   *All questions carry equal marks.*

Q1) Answer the following :   **[8 × 2 = 16]**

  a)   Explain the formation of co-ordinate bond with suitable example.

  b)   What are distereo - isomers?

  c)   How will you determine the solubility of sparingly soluble salt? (eg : AgBr)

  d)   Define the terms :

    i)   Degree of freedom

    ii)   Component

  e)   50% of first order reaction is completed in 100 min; calculate the rate constant.

 f)   Represent the electrode and note down the reaction's expression for it's emf.

$$AgBr_{(s)} + e^{\ominus} \rightarrow Ag_{(s)} + Br^{\ominus}$$
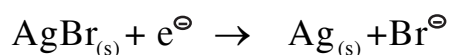
P.T.O.

g) Calculate the moles of Hydrogen gas present in the 500 mL sample H_2 gas at a pressure of 1 bar and 27°C.

h) Explain (State) the Faraday's laws of electrolysis.

Q2) Attempt the following : [4 × 4 = 16]

a) Explain the formation of sigma and pi bonds with suitable examples.

b) What is energy of activation? How it is determined graphically?

c) What is ionic bond and covalent bond? Explain with suitable examples.

d) What is single electrode potential? Derive the equation (Nernst equation) for the following reaction

$$aA + bB \rightleftharpoons cC + dD.$$
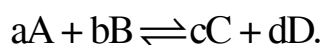
e) What do you mean by eutectic point? Explain phase diagram for two component system and apply Gibb's phase rule for it.

f) Derive an expression for rate constant for the reaction $A+B \rightarrow C+D$ (Given $C_A = C_B$).

Q3) Answer the following (any four) : [4 × 4 = 16]

a) For the cell $Zn|ZnCl_2|Cl,^{\ominus}AgCl_{(s)}|Ag$ write the cell reactions
   $_{(a=0.015)}$
   and calculate $\Delta Ci^\circ, \Delta S^\circ$ at 25°C,

$$\left[\text{Given } E^\circ = 1.015 \text{ v}, \frac{dE}{dT} = 4.92\times10^{-4} \text{ V}\!\!\diagup\!\!_k \right]$$

b) Derive the term cryoscopic constant and derive thermodynamically the reaction.

$$K_f = \frac{RT_0^2}{1000 \, L_f}$$

c) 2.5 gm of a substance dissolved in 125 mL of water gave an osmotic pressure 1172 mm of Hg at 20°C; calculate the molecular weight of the substance [R = 0.082 lit. atm]

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d) A second order reaction ($C_A = C_B$) requires 400 sec for 50% of completion; calculate time required for 65% and 75% of the completion.

e) Find the oxidation half reaction and reduction half reaction from the following equations.

   i) $2 \text{ KI} + \text{Cl}_2 \rightarrow \text{I}_2 + 2 \text{ KCl}$

   ii) $\text{Fe}^{+3} + \text{I}^- \rightarrow \text{Fe}^{+2} + \text{I}_2$
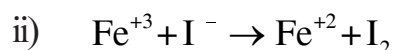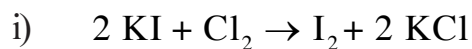
   and explain the terms oxidation state and valency.

f) Give the difference between order and molecularity of reaction with examples.

Q4) Attempt the following (any four) :   [4 × 4 = 16]

a) Discuss (explain) the stability and energy of the conformations of buton with energy profile diagram.

b) Explain the following type of organic reactions with examples

   i) Reduction

   ii) Oxidation

   iii) Addition

   iv) Elemination

c) What is plane polarised light? Explain it's effect over optically active compounds with examples.

d) What are potentiometric titrations? Explain oxidation - reduction titration with examples.

e) The conductance of ammonium chloride at infinite dilution is $149.7 \Omega^{-1}$, ionic conductance of $^\ominus\text{OH}$ and $\text{Cl}^\ominus$ ions are 198 and $76.3 \Omega^{-1}$ respectively. Calculate equivalent conductance of NH_4Cl at infinite dilution.

f) Write a note on electrochemical series and construct electrochemical cell of Zn (Zinc) and Cd (Cadmium) by writting cell reactions.

Q5) Attempt the following (any two) :   [2 × 8 = 16]

   a) Explain any four postulates of kinetic theory of gases and derive an expression for kinetic gas equation $\left(E = \dfrac{3}{2} nRT \right)$.

   b) Explain the molecular orbital theory and linear combination of Atomic orbitals as well as prove that oxygen molecule is paramagnetic and Nitrogen molecule is dimagnetic in nature.

   c) Give the classification of electrodes and explain any four electrodes briefly with diagram.

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[4619] - 1001
F.Y. B.Sc.
BIOTECHNOLOGY
Bb 101 : Fundamentals of Chemistry
(2013 Pattern)

Time : 3 Hours]   *[Max. Marks : 80*
Instructions to the candidates:

1) *All questions are compulsory.*
2) *All questions carry equal marks.*
3) *Figures to the right indicate full marks.*
4) *Draw neat and labelled diagrams wherever necessary.*
5) *Use of logarithmic tables slide rule, Mollier charts, electronic pocket calculator and steam tables is allowed.*

Q1) Answer the following :   **[8 × 2 = 16]**

a) Explain Avogadro's principle and Graham's Law of diffusion as well as deduce it from kinetic gas equation.

b) Define catalyst and explain effect of catalyst on rate of reaction.

c) Define the Bond order and explain its relation with stability of molecule.

d) Calculate the degree of dissociation of sodium chloride; if it's Vants Hoff factor is 1.46.

e) Explain the terms specific conductance and equivalent conductance.

f) What is ionic bond? How it is formed?

g) Draw saw Horse formula representation of n-Butane and ethane.

h) What is half life period? Calculate (Derive) half life period of the first order reaction.

P.T.O.

Q2) Attempt the following (Any 4) :   **[4 × 4 = 16]**

a) What do you mean by elemination reaction? Explain types of elemination reaction briefly.

b) Give the difference between co-valent bond and co-ordinate bond with examples.

c) What is mean by rate of reaction? Derive the rate equation for First Order; reaction.

d) Give the difference between Atomic orbitals and molecular orbitals.

e) Draw schematically phase diagram of sulphur system and apply Gibb's phase rule.

f) Define Osmosis, Osmotic pressure and state laws of Osmotic pressure.

Q3) Attempt the following (Any 4) :   **[4 × 4 = 16]**

a) If 15% of the substance decomposes in the first 10 min in a first order reaction then calculate how much amount of reactant remain undecomposed after one hour (60 min).

b) Explain the energy of activation and temperature dependance of rate of reaction.

c) Draw the phase diagram of Magnesium and Zinc system (two component system) and apply Gibb's phase rule for it.

d) Write a note on distribution of molecular speeds or kinetic Energy at different temperature.

e) Explain addition reaction and Markownikoff's as well as Anti-Markownikoff's rule.

f) What does mean by reference electrode? Explain the standard Hydrogen electrode.

Q4) Attempt the following (Any 2) :   [2 × 8 = 16]

a) Explain potentiometric determination of pH and Potentiometric titrations Briefly.

b) Explain conductometric titration briefly and derive the relation between α and k_a.

c) What is mean by optical isomerism and conformational isomerism. Explain briefly with necessary conditions for molecule to be optically active and conformational isomerism of n-butane with the help of energy profile diagram.

d) Derive an expression for rate constant for second order equation (reaction)

[given case (i) $C_A = C_B$, A + B $\rightarrow$ Product

case (ii) $C_A \neq C_B$, A + B $\rightarrow$ Product]

Q5) Attempt the following (Any One) :   [1 × 16 = 16]

a) Give the classification of electro chemical cells briefly and explain each class with diagram briefly.

b) Give and explain the postulates of kinetic theory of gases and derive the gas equation $E = \dfrac{3}{2}(nRT)$.

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Total No. of Questions : 5]

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SEAT No. : ☐

[Total No. of Pages : 3

[4619] - 1002
F.Y. B.Sc.
BIOTECHNOLOGY
Bb - 102 : Fundamentals of Physics
(2013 Pattern)

Time : 3 Hours]   *[Max. Marks : 80*
Instructions to the candidates:
    1)   *All questions are compulsory.*
    2)   *Figures to the right indicate full marks.*
    3)   *Use of calculators is allowed.*
    4)   *Neat diagrams must be drawn wherever necessary.*

Q1) Attempt **all** of the following :   **[8 × 2 = 16]**

    a)   State Hooke's law.

    b)   What is a mole? What is the unit of luminous intensity.

    c)   Why hydrostatic pressure is a scalar quantity?

    d)   State Doppler's effect.

    e)   What is a polaroid?

    f)   What do you mean by International Practical Temperature scale?

    g)   State first law of thermodynamics.

    h)   State Newton's law of viscosity.

Q2) Attempt **any four** of the following :   **[4 × 4 = 16]**

    a)   What do you mean by fundamental and derived units? Classify the following units into fundamental and derived units.
        Kilogram, Ampere, Newton, Candela, Kelvin, Joule, Volt, Ohm, Coulomb, Watt, Hertz, Sec.

    b)   State relevance of elasticity to life sciences.

    c)   Define pressure. With the help of suitable diagram explain how atmospheric pressure can be measured using a mercury barometer.

P.T.O.

d) Define surface tension. Discuss with examples the effect of temperature contamination and solute on the surface tension of liquid.

e) Two organ pipes closed at one end are of equal diameters but different lengths. They produce 8 beats per second when sounded simultaneously. The smaller organ pipe is 16 cm. long and the speed of sound in air is 320% m/s. Find the length of the other pipe.

f) State the different types of energies possessed by liquid flow. Explain the concept of pressure energy of the liquid.

Q3) Attempt **any four** of the following :   [4 × 4 = 16]

a) State and explain Zeroth law of thermodynamics.

b) What is a refrigerent? Explain three classes of refrigerent.

c) Give applications of laser.

d) Calculate the change in entropy when 1 mole of an ideal gas is allowed to expand from a volume of 1 litre to a volume of 10 litres at 27°C.

e) What is biomagnetism? How it is useful in health care? Discuss with the help or example.

f) Define the following terms.

    i)   Electric intensity   ii)   Electric potential

    iii)   Electric flux   iv)   Electric lines of force

Q4) Attempt **any two** of the following :   [2 × 8 = 16]

a) Distinguish between paramagnetic and ferromagnetic materials. A current of 10 nA is established in circular loop of radius 5 cm. Find the magnetic dipole moment of current loop.

b) What do you understand by interference? Explain the terms constructive and destructive interference consider interference between waves from two sources of intensities I and 4I. Find the intensities at points, where path difference is $\Pi/2$ and Π .

c) Show that an organ pipe produces both even and odd harmonics. What is the frequency of fundamental tone without end correction and with end correction.

d) i) Explain the term thermal equilibrium.

    ii) Define coefficient of performance and efficiency of a refrigerator. Obtain relation between them.

Q5) Attempt the following :   **[2 × 8 = 16]**

a) Explain the terms :

    i) Adiabatic change   ii) Isothermal change

    iii) Isobaric change   iv) Isochoric change

b) With the help of stress-strain curve, explain the terms elastic limit, breaking stres and breaking point.
The original length of rubber strip is 100 cm and it is stretched to 105 cm. by applying external force. Due to this, the diameter of the strip changes from 0.5 cm to 0.495 cm. Calculate the poisson's ratio.

OR

a) Describe capillary rise method to determine surface tension of liquid. Derive necessary formula.

b) With the help of suitable diagram, explain the principle construction and working of a venturimeter.
Water flowing in a horizontal pipe has a speed of 20 cm/s at one end point and 15 cm/s at another point. Determine the pressure drop between two points.

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[4619] - 1003
F.Y. B.Sc.
BIOTECHNOLOGY
Bb - 103 : Basics of Plant and Animal Sciences
(2013 Pattern)

Time : 3 Hours]   *[Max. Marks : 80*
Instructions to the candidates:

 1) *Answers to the two sections should be written in separate answer books.*
 2) *All questions are compulsory.*
 3) *Neat diagrams must be drawn wherever necessary.*
 4) *Figures to the right indicate full marks.*

SECTION - I

Q1) Answer the following questions :   **[8]**

 a) What are fungi? Give any one example.

 b) What are phylloclade? Give one example.

 c) What are microelements? Required by plants.

 d) Define phytocrome. Give one example.

Q2) Write short notes (Any two) :   **[8]**

 a) Describe the various modified stems.

 b) What is Diffusion? Write factors affecting Diffusion.

 c) Write a note on the tropic movements of plants.

Q3) Write short notes (Any two) :   **[8]**

 a) Discuss the important characteristic features of Algae and Bryophytes.

 b) Write the role and Defeciency symptoms of nitrogen and phosphorus.

 c) Give the salient features of a plant cell.

Q4) Attempt any two :   **[16]**

    a)   What is osmosis? Describe the significance and Different types of osmosis.

    b)   Give in detailed the role of photoperiod and temperature in flowering.

    c)   Give the Role of plant growth Regulators in growth and development of plants.

SECTION - II

(Zoology)

Q5) Answer the following :   **[8]**

    a)   Enlist two examples of Platyhelminthes.

    b)   Define Ectoparasite.

    c)   What are hormones?

    d)   What is epithelial tissue?

Q6) Write short notes on (any two) :   **[8]**

    a)   Aquaculture

    b)   Comment on functions of hormones

    c)   Parasitic adaptations of Taenia

Q7) Attempt the following (any two):   **[8]**

    a)   Comment on oxyhaemoglobin-dissociation curve.

    b)   What are reflexes?

    c)   Economic importance of silk.

Q8) Answer the following in detail (Any Two) :   **[16]**

    a)   Give an illustrated account of the life cycle of Plasmodium vivax.

    b)   Honey bee is a social insect. Discuss.

    c)   Give detail account on male reproductive system of frog.

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[4619] - 1004

F.Y. B.Sc.

BIOTECHNOLOGY

Bb - 104 : Mathematics and Statistical Methods for Biologists

(2013 Pattern)

Time : 3 Hours]   *[Max. Marks : 80*

Instructions to the candidates:

    1)   *All questions are compulsory.*

    2)   *Figures to the right indicate full marks.*

    3)   *Use of non-programmable scientific calculator is allowed.*

    4)   *Solve each section on separate answer paper.*

SECTION - I
(Mathematics)

Q1) Attempt each of the following :   **[5 × 2 = 10]**

    a)   If $A = \begin{bmatrix} 1 & 2 \\ 0 & -1 \\ 3 & 1 \end{bmatrix}$, $B = \begin{bmatrix} -1 & 1 & 0 \\ 4 & 2 & 1 \end{bmatrix}$ then, Find AB and BA. Is AB = BA?

    b)   Using $\in$ - definition show that $\lim\limits_{n \to \infty} \dfrac{1}{n+1} = 0$.

    c)   Examine the convergence of the series $\sum\limits_{n=1}^{\infty} \left(\dfrac{5}{2} \right)^n$.

    d)   Find modulus and principal argument of $\dfrac{1+i^3}{2i^2 + 3i^4}$.

    e)   If $Z = e^x \sin(xy)$, then find Zx and Zy.

Q2) Attempt any four of the following :   [4 × 2½ = 10]

a)   Find rank of the matrix

$$\begin{bmatrix} 1 & 1 & 1 & 1 \\ 1 & 1 & -2 & 3 \\ 2 & 1 & 1 & 2 \end{bmatrix}$$

b)   Solve : $x^4 - i = 0$

c)   Check whether the set $\{(1, 1, 0), (0, 2, 3), (1, 2, 3)\}$ is linearly dependent in $\mathbb{R}^3$.

d)   Test the convergence of the series $\sum\limits_{n=0}^{\infty} \dfrac{5^n}{(n+1)!}$.

e)   Check for exactness and hence solve the following differential equation.
$(x^2 - 4xy - 2y^2)dx + (y^2 - 4xy - 2x^2)dy = 0$

f)   If $u = \log (x-2y)$ then show that $\dfrac{\partial^2 u}{\partial x \partial y} = \dfrac{\partial^2 u}{\partial y \partial x}$.

Q3) Attempt any two of the following :   [2 × 5 = 10]

a)   Solve the following system of linear equations.

$x - 2y + 3z = -1$

$2x - y + 2z = 2$

$3x + y + 2z = 3$

b)   Find the stationary points and examine for minimum and maximum value for the function $f(x, y) = x^2 - xy + y^2 - 2x + y$.

c)   Show that the following sequence is convergent.

$$\sqrt{5}, \quad \sqrt{5\sqrt{5}}, \quad \sqrt{5\sqrt{5\sqrt{5}}}, \ldots\ldots\ldots$$

Q4) Attempt any one of the following : **[1 × 10 = 10]**

a) Solve the differential equation $\dfrac{dy}{dx} = \dfrac{x+y+1}{x-y+3}$.

b) i) Find eigenvalues and find eigenvector corresponding to the smallest

eigenvalue of the matrix $A = \begin{bmatrix} 1 & 1 & 1 \\ 0 & 2 & 1 \\ 0 & 2 & 3 \end{bmatrix}$

ii) Verify Cayley Hamilton theorem for the matrix $A = \begin{bmatrix} 2 & 1 \\ 1 & 3 \end{bmatrix}$

SECTION - II

(Statistics)

Q5) Attempt the following : **[5 × 2 = 10]**

a) Explain the term sample space with illustration.

b) Define conditional probability of an event.

c) State mean and variance of Binomial distribution.

d) Explain the term - positively skewed data.

e) Compute mean for data : 2.92, 4.64, 3.92, 6.81.

Q6) Attempt any four : **[4 × 2½ = 10]**

a) For certain data of 10 observations $\sum(x_i - 3) = -2$ and $\sum(x_i - 3)^2 = 10$, find variance and coefficient of variation.

b) Define - normal distribution. State Linear property for normal distributions.

c) Define kurtosis and explain any two types of kurtosis.

d) State test statistic for testing equality of two means of independent populations. (for small sample).

e) Define multiple correlation and state formula for $R_{1.23}$.

Q7) Attempt any two :   **[2 × 5 = 10]**

a) Find two regression lines for the following data.

$\bar{x} = 6, \bar{y} = 18, r = 0.8, \text{cov}(x, y) = 12, \text{var}(x) = 64$ and estimate y for $x = 3$.

b) Define the following terms.

    i)   sampling distribution

    ii)   level of significance

    iii) standard error of statistic

    iv) type II error

    v)   null hypothesis

c) Data is selected from normal distribution with mean = 25 and standard deviation 4, find a probability that an observation lies between 20 and 28.

Q8) Attempt any one :   **[1 × 10 = 10]**

a) Explain - one way ANOVA.

b) i)   Explain procedure for testing independence of two attributes.

    ii)   Explain how scatter diagram is useful for judging relation between two variables.

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Total No. of Questions : 5]

P190

SEAT No. :

[Total No. of Pages : 2

[4619] - 1005
F.Y. B.Sc.
BIOTECHNOLOGY
Bb - 105 : Fundamentals of Biological Chemistry
(2013 Pattern)

Time : 3 Hours]   *[Max. Marks : 80*
Instructions to the candidates:
  1)   *All questions are compulsory.*
  2)   *Draw neat and labelled diagrams whenever necessary.*
  3)   *Figures to the right indicate full marks.*

Q1) Attempt all the following :   **[8 × 2 = 16]**
   a)   What are aromatic amino acids? Give 2 examples of it.
   b)   What are saturated fatty acids? Give 2 examples.
   c)   Explain hydrophobic interactions.
   d)   Define : Free energy.
   e)   What is Osmosis.
   f)   Define active site of an enzyme.
   g)   Give disorder caused due to deficiency of Thiamine and Riboflarin.
   h)   What are epimers of monosaccharides? Give an example.

Q2) Answer any four of the following :   **[4 × 4 = 16]**
   a)   Explain competitive inhibition of enzymes.
   b)   Write a note on Glycolipids.
   c)   Write a short note on t-RNA.
   d)   What are coenzymes? Give role of lipoic acid and pantothenale.
   e)   Write a note on 'α' helix structure of proteins.
   f)   Describe the nucleotide structure.

P.T.O.

Q3) Answer any four of the following :   [4 × 4 = 16]

 a) Give a brief account on steroid lipid.

 b) Explain induce fit hypothesis for enzyme activity.

 c) Write a note on proteoglycan matrix.

 d) Differentiate between reducing and non-reducing sugars.

 e) How is the pH of blood maintained?

 f) Explain stereospecificity in biomolecule.

Q4) Answer any two of the following :   [2 × 8 = 16]

 a) Describe different types of protein in living system.

 b) Explain Watson and Crick model of DNA.

 c) Give an account on storage polysaccharides.

Q5) Answer any one of the following :   [1 × 16 = 16]

 a) Give classification of enzymes with suitable example of each class.

 b) Classify aminoacids on basis of their side chains (R groups). Explain why amino acids are zwitterions.

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[4619] - 1006
F.Y. B.Sc.
BIOTECHNOLOGY
Bb - 106 : Biophysics and Instrumentation
(2013 Pattern)

Time : 3 Hours]   *[Max. Marks : 80*

Instructions to the candidates:

   1)   ***All questions are compulsory.***

   2)   ***Draw neat and labelled diagrams wherever necessary.***

   3)   ***Figures to the right indicate full marks.***

   4)   ***Use of scientific calculator is allowed.***

Q1) Attempt all of the following :   **[8 × 2 = 16]**

   a)   Give any two applications of radioactive elements.

   b)   Define resolving power of microscope.

   c)   Give full forms of the following.

         i)   AAS   ii)   NMR

         iii)   SEM   iv)   TEM

   d)   Give composition of the cell membrane.

   e)   State Nernst's equation.

   f)   Write two important differences between colorimeter and spectrophotometer.

   g)   State Lambert's Law.

   h)   Enlist different types of centrifugation method.

Q2) Answer any four of the following :   **[4 × 4 = 16]**

   a)   Give characteristics of alpha and beta rays.

   b)   Write a note on platinum resistance thermometer.

   c)   Draw and explain electromagnetic spectrum.

   d)   Explain what is chromatic aberrations.

   e)   Write a note on AAS.

   f)   Write a note on Action Potential.

P.T.O.

Q3) Answer any four of the following :   **[4 × 4 = 16]**

a)   Write a note on quantum numbers.

b)   What is biopotential and give application of electro encephalogram (EEG).

c)   Write a note on Pauli's exclusion principle.

d)   Explain harmful effects of radiations on biological system.

e)   Write a note on phase constrast microscope.

f)   Calculate the speed of rotor in rpm which is rotating at 6000g for the following conditions.

    i)   When radius of rotor is 10 cm.

    ii) When radius of rotor is 7 cm.

Q4) Answer any two of the following :   **[2 × 8 = 16]**

a)   Explain the construction, working and principle of scintillation counter.

b)   Explain the principle of SEM and support it with ray diagram. Also give its applications.

c)   Explain construction and working of colorimeter with diagram.

d)   Explain principle and working of a pH meter. Give its applications.

Q5) Answer any one of the following :   **[1 × 16 = 16]**

a)   Explain Radioimmuno assay (RIA) with help of following points.

    i)   Principle   ii)   Mechanism

    iii) Advantages & limitations   iv)   Applications

b)   i)   Derive the relation of energy of an electron in Bohr's orbit.

    ii) Explain emission spectra of sodium (Na) atom.

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[4619] - 1007

F.Y.B.Sc.

BIOTECHNOLOGY

Bb - 107 : Microbiology

(2013 Pattern)

Time : 3 Hours]   *[Max. Marks : 80*

Instructions to the candidates :

    1)   *All questions are compulsory.*

    2)   *All questions carry equal marks.*

    3)   *Neat diagrams must be drawn wherever necessary*

    4)   *Figures to the right indicate full marks.*

Q1)   Answer the following   **[8 × 2 = 16]**

    a)   What is a theory of abiogenesis?

    b)   What is meant by Co-Culture

    c)   State two distinguishing characters of algae

    d)   State two function of pili

    e)   Define strick an aerobes with example

    f)   What is selective media? give one example

    g)   What is meant by counter stain? Give its use

    h)   Define and draw umbonate colony

Q2)   Answer the following **(Any four)**   **[4 × 4 =16]**

    a)   Differentiate between prokaryotes and eukaryotes

    b)   What is differential staining? Give the principle of acid fast staining

    c)   State the salient feature of Bergu's manual

    d)   Justify: Mackonkey's agar is selective and differential medium

    e)   What is mean by sterilization ? Describe mechanism of action of alcohol

    f)   Describe in brief an indirect methods for enumeration of bacterial cells

Q3) Answer the following **(Any four)** [4 × 4 =16]

a) Describe life cycle of T even phages

b) Classify bacteria depend on temperature requirement for their growth.

c) Describe in brief : Ectomycorrhiza

d) Describe different methods of bacterial culture preservation at law temperature

e) A sewage water sample was analyzed and following data was obtained

    i)   Volume of sample plated : 0.1 ml

    ii)   Dilution of sample : 10^{-8}

    iii)   Number of colonies obtained 110

        Calculate CFU of the sample

f) State physiological & metabolic characteristics used in bacterial classification.

Q4) Answer the following **(Any Two)** [2 × 8 = 16]

a) Describe theory of abiogenesis? Write a note on contribution of Louis pasture in microbiology

b) Justify : Biofilm is a novel colony formation pattern

c) Describe in detail ultrastructure of cell membrane

d) Describe in detail various biosafety measure to be taken while handling of microorganism

Q5) Answer the following **(Any one)** [1 × 16 = 16]

a) Classify viruses depending on genetic material they contain

b) Describe ultrastructure of gram negative and gram positive bacterial cell wall.

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[4619] - 1008
F.Y. B.Sc.
BIOTECHNOLOGY
Bb - 108 : Computers and Applications
(2013 Pattern)

Time : 3 Hours]

[Max. Marks : 80

Instructions to the candidates :
   1)   All questions are compulsory.
   2)   Draw neat and labeled diagrams whenever necessary.
   3)   Figures to the right indicate full marks.

Q1) Attempt all of the following: [8 × 2 = 16]

   a) What is a Main frame computer ? Explain its use.

   b) Define the term information.

   c) State true or false :-

      i)   RAM is a volatile memory.

      ii)   During booting of computer BIOS is run from ROM.

   d) List the different types of viruses.

   e) Explain the following terms:

      i)   ICON

      ii)   Taskbar

   f) Where do we use the following networking devices :

      i)   Hub

      ii)   Router

   g) Explain Hierarchical data Model.

   h) Define the terms :-

      i)   Database instance

      ii)   Database Schema

P.T.O.

Q2) Attempt any FOUR of the following: **[4 × 4 =16]**

   a) Explain the generations of computers.

   b) What are Input devices? Explain working of MICR.

   c) What is a database? Why it is used?

   d) Explain fiber optic cable in detail.

   e) Explain ISO-OSI model.

Q3) Attempt any FOUR of the following :   **[4 × 4 =16]**

   a) Write a short note on Google Search Engine.

   b) State any Four Features of Ms-Excel.

   c) Explain the Mail-Merge feature in Ms-word.

   d) Write a short note on :

      i)   Relational Model.

      ii)   Network Model.

   e) Write a short note on computer virus and worm.

Q4) Attempt any TWO of the following :   **[2 × 8 = 16]**

   a) Explain various topologies used for computer networks.

   b) Write a short note on Toolbar of Ms-word.

   c) Write a short note on :

      i)   Pubmed.

      ii)   Medline.

Q5) Attempt the following :   **[2 × 8 = 16]**

    a) Write an algorithm and draw a flow chart for displaying addition of all even numbers between n1 to n2.

<div align="center">OR</div>

       Write an algorithm and draw a flow chart for finding GCD and LCM of given two numbers.

    b) What is an algorithm? List its characteristics. Also write an algorithm to display following.

1
2 3
4 5 6
7 8 9 10

<div align="center">OR</div>

What is an operating system? Explain various functions of operating system.

● ● ●

[4619] - 101
S.Y. B.Sc. (Semester - I)
BIOTECHNOLOGY
Bb 211 : Genetics & Immunology
(2013 Pattern)

Time : 3 Hours]   *[Max. Marks : 80*

Instructions to the candidates:
  1) *All questions are compulsory.*
  2) *Figures to the right indicate full marks.*
  3) *Draw neat and labelled diagrams wherever necessary.*

Q1) Answer the following :   [10 × 2 = 20]

  a) Differentiate between back cross and test cross.

  b) What is a plasmid?

  c) What are in ducible operons?

  d) Define linkage.

  e) Differentiate between auto polyploidy and allopolyploidy.

  f) What is chromosome interference?

  g) State Mendel's first law of inheritance with example.

  h) What is cis and trans arrangement of a gene?

  i) Differentiate between tetrasomy and tetraploidy.

  j) Define pedigree.

Q2) Answer the following :   [5 × 2 = 10]

  a) IgE & its significance.

  b) Define epitope and paratope.

  c) Differentiate between CD4 & CD8 molecule.

  d) Enlist types of vaccines with examples.

  e) Antigenicity Vs immunogenicity - discuss.

Q3) Attempt <u>any three</u> of the following : **[3 × 5 = 15]**

    a)   Differentiate between F transfer and Hfr transfer.

    b)   What is dosage compensation? Describe with example, how it is achieved?

    c)   Write a note on analysis of unordered tetrads.

    d)   Enumerate and explain assumptions of Hardy-Weinberg principle.

Q4) Attempt <u>any three</u> of the following : **[3 × 5 = 15]**

    a)   What are chromosomal aberrations? Enlist and explain types of deletions and duplications.

    b)   Explain dominant epistasis with a suitable example.

    c)   Write a note on aneuploidy in humans.

    d)   Write a note on specialized transduction.

Q5) Attempt <u>any one</u> of the following : **[10]**

    a)   Explain in detail, the structure of arabinose operon. Add a note on its regulation.

    b)   Define transposable elements. Explain any two transposable elements present in eukaryotes. Add a note on their mechanism of transposition.

Q6) Attempt <u>any two</u> of the following : **[2 × 5 = 10]**

    a)   How recombinant vaccines are produced? Give an example of such vaccine for human use.

    b)   "Cell mediated immune response is MHC restricted" - justify.

    c)   Classify immunoglobulins on the basis of its fine structure.

    d)   Write a brief note on various types of hypersensitivity reaction and its significance.

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[4619] - 102

S.Y. B.Sc. (Semester - I)
BIOTECHNOLOGY
Bb - 212 : Cell Biology
(2013 Pattern)

Time : 3 Hours]   *[Max. Marks : 80*

Instructions to the candidates:

   1)   *All questions are compulsory.*
   2)   *Figures to the right indicate full marks.*
   3)   *Draw neat labelled diagrams wherever necessary.*

Q1) Answer in brief :   **[10 × 2 = 20]**

   a)   Define : G_2 phase of cell cycle.

   b)   Enlist any 4 types of lipid movements that contribute to membrane fluidity.

   c)   Justify : Completion of mitosis is not completion of cell division.

   d)   What is the role of lysosomes?

   e)   What is fibronectin?

   f)   Role of glycoproteins.

   g)   Function of COP I and COP II vesicles.

   h)   What is TIM and TOM complex.

   i)   Enlist terminal electron acceptors in photosynthesis.

   j)   Define : Membrane stop signals.

Q2) Short Notes (any three) :   **[3 × 5 = 15]**

   a)   Check points in cell cycle.

   b)   Protein transport across mitochondrial membrane.

   c)   Programmed Cell Death.

   d)   Animal Cell Membrane.

P.T.O.

Q3) Attempt any three :   [3 × 5 = 15]

    a)   What are tight junctions? Elaborate.

    b)   Justify : End point of meiosis is 4 haploid cells.

    c)   What are microtubules? Explain their role in vesicular transport.

    d)   Chloroplast double membrane.

Q4) a)   Explain in detail role of Golgi complex in transport and modification of secretory proteins.   [7]

    b)   Explain in detail mechanism of glucose transport in epithelial cells.   [8]

Q5) a)   Ultrastructure of mitochondria.   [7]

    b)   What is "electron transport chain" and explain its role in respiration. [8]

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[4619] - 103

S.Y. B.Sc. (Semester - I)
BIOTECHNOLOGY
Bb 213 : Environmental Biology and Biotechnology
(2013 Pattern)

Time : 3 Hours]
[Max. Marks : 80

Instructions to the candidates:

1) *All questions are compulsory.*
2) *Figures to the right indicate full marks.*
3) *Draw neat and labelled diagrams wherever necessary.*

Q1) Answer in 2- 3 sentences :
[10 × 2 = 20]

a) Explain Lithosphere.

b) Define community.

c) Explain Net Primary Productivity.

d) Acid Rain.

e) What is Agenda 21?

f) Define radiation pollution.

g) What is IUCN?

h) What is ex situ conservation.

i) Explain food web.

j) What is biomedical waste?

Q2) Answer in brief (Any three) :
[3 × 5 = 15]

a) Applications of remote sensing.

b) Wild life Protection Act, 1972.

c) Bioremediation.

d) Photochemical smog.

P.T.O.

Q3) Write short notes on (Any three)   **[3 × 5 = 15]**

   a)   Ecosystem evolution

   b)   Natural factors affecting ecosystems

   c)   Nitrogen cycle

   d)   Pesticide pollution

Q4) a)   Discuss in detail the importance of ozone layer in the atmosphere and
           the factors responsible for its depletion.   **[7]**

   b)   Discuss the importance of EIA and the stages involved in the EA
        procedure.   **[8]**

Q5) a)   Enumerate the various strategies for conservation of endangered plant
           genetic resources.   **[7]**

   b)   Discuss in detail the methods employed in phytoremediation of
        contaminated soils.   **[8]**

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[4619]-11
S.Y. B.Sc. (Semester - I)
BIOTECHNOLOGY
Bb-211: Genetics and Immunology
(2008 Pattern)

Time : 3 Hours]

[Max. Marks : 80

Instructions to the candidates :
 1) *All questions are compulsory.*
 2) *Figures to the right indicate full marks.*
 3) *Draw neat labelled diagram wherever necessary.*

Q1) Attempt the following :   **[10 × 2 = 20]**
 a) Define incomplete dominance.
 b) Enlist any four chemical mutagens.
 c) State law of independent assortment.
 d) What is Down's syndrome?
 e) What are amphidiploids?
 f) Define antigenicity.
 g) I_gA and its significance.
 h) T cytotoxic cells.
 i) Adjunant.
 j) Define precipitation.

Q2) a) Explain in detail the process of generalized transduction.   **[8]**
                            OR
   Define transposons. Describe transposable elements in bacteria.
 b) What are mutations? Explain any two types of mutations. Add a note on
    their significance.   **[7]**
                            OR
   Explain the structure of lactase operon. Add a note on its regulation.

P.T.O.

Q3) Answer the following (Any three) : **[3 × 5 = 15]**
   a) Differentiate between humoral and cell mediated immunity.
   b) Write a note on various cells involved in innate immune response.
   c) Give a brief account of hybridoma technology.
   d) What are live attenuated vaccines? Write a note on its advantages and disadvantages.
   e) Explain in brief the morphology and function of spleen.

Q4) a) Explain in detail the various steps of inflammation and its symptoms.**[8]**

OR

   Describe in detail the complement fixation test and its significance.
   b) Define Immunoglobulin. Classify immunoglobulins on the basis of their fine structure. Add a note on their functions. **[7]**

OR

   Write in detail the process of antigen processing and presentation.

Q5) Write in brief (Any three) : **[3 × 5 = 15]**
   a) Explain supplementary genes with suitable example.
   b) Write a note on conjugation as a mechanism of DNA transfer in bacteria.
   c) What are inversions? Explain its types and comment on typical behaviour of inversion heterozygotes during cell division.
   d) Define linkage. Explain complete and incomplete linkage with example.
   e) Describe general properties of plasmids.

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[4619] - 12
S.Y. B.Sc. (Semester - I)
BIOTECHNOLOGY
Bb - 212 : Cell Biology
(2008 Pattern)

Time : 3 Hours]   *[Max. Marks : 80*

Instructions :-

    1)   *All questions are compulsory.*

    2)   *Figures to the right indicate full marks.*

    3)   *Draw neat labelled diagrams wherever necessary.*

Q1) Answer in brief :   [10 × 2 = 20]

    a)   Define : lipid raft

    b)   Enlist different types of cell shapes.

    c)   Give role of proteosomes.

    d)   Comment on pachytene in Meiosis - I

    e)   Write the function of connective tissue.

    f)   What is the role of G-proteins in cell signaling?

    g)   Give the principle of differential centrifugation technique?

    h)   Comment on the role of collagen in ECM.

    i)   Completion of mitosis is not the completion of cell division : Justify.

    j)   Define G_2 phase of cell cycle.

Q2) Short notes (Any three)   [3 × 5 = 15]

    a)   Cyclin recycling

    b)   Protein targeting to nucleus.

    c)   Dead tissues in plants.

    d)   Neat labelled diagram of ultrastructure of E.R. and golgi.

Q3) Attempt <u>Any three</u> of the following   **[3 × 5 = 15]**

    a)   What are tight junctions? Explain with appropriate example.

    b)   Write a note on fluroscence microscopy.

    c)   Define necrosis. Explain the cellular events that take place in necrotic tissue.

    d)   Write a note on polarity of microtubule.

Q4) Explain in detail; with help of diagram the process of meiosis.   **[15]**

<div align="center">OR</div>

Explain in detail the concept of cytoskeleton, it's components and functions.

Q5) a)   Describe MAP-Kinase pathway   **[7]**

    b)   Explain in detail structure of plasma membrane. Add a note on role of individual components.   **[8]**

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[4619] - 13

S.Y. B.Sc. (Semester - I)
BIOTECHNOLOGY
Bb :213 : Molecular Biology
(2008 Pattern)

Time : 3 Hours]   *[Max. Marks : 80*

Instructions to the candidates :

1) *All questions are compulsory.*

2) *Figures to the right indicate full marks.*

3) *Draw neat labelled diagrams whenever necessary.*

Q1) Answer in brief   **[10×2=20]**

i) Define: SD sequences

ii) Give role of H1 protein in nucleosome structure

iii) What is wobble hypothesis ?

iv) Write the importance – 10 and – 35 sequence in eukaryotes

v) What is Hyper chromic shift ?

vi) Give the importance of DNA pol III enzyme in replication

vii) Define: Transition.

viii) What is the role of aminoacyl tRNA in translation ?

ix) What are abzymes ?

x) Give any two inhibitors of translation.

P.T.O.

Q2) Short notes (Any three) [3×5=15]

    i)   Griffith experiment

    ii)   Clover leaf model of tRNA

    iii) Compare and contrast Euchromatin and Heterochromatin

    iv) Split genes

Q3) a)   Write the role of various enzymes involved in DNA replication   **[7]**

OR

Describe in detail organisation of eukaryotic genome

    b)   What are mutations ? Enlist various repair mechanisms and explain any one of them   **[8]**

Q4) a)   Explain $'\rho'$ independent termination of transcription.   **[7]**

OR

Role of CAMP and CAP in prokaryotic transcription regulation

    b)   Describe the processing of pre mRNA   **[8]**

Q5) Explain various post - translational modifications of proteins. Add a note on protein transport.   **[15]**

OR

Compare and contrast prokaryotic and eukaryotic protein synthesis

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[4619] - 2
F.Y. B.Sc.
BIOTECHNOLOGY
Bb - 102 : Fundamentals of Physics
(2008 Pattern)

Time : 3 Hours]   *[Max. Marks : 80*

Instructions to the candidates :

1) *All questions are compulsory.*
2) *Figures to the right indicate full marks.*
3) *Use of calculators is allowed.*
4) *Neat diagrams must be draw wherever necessary.*

Q1) Attempt **all** of the following :   **[8 × 2 = 16]**

   a)   Define poisson's ratio. What is the range of its value?

   b)   Why kelvin is called as thermodynamic temperature scale.

   c)   Define pressure in a fluid. What is it's S.I. unit?

   d)   Define angle of contact. State under what condition it is zero?

   e)   Define magnetic permeability.

   f)   What is polarized and unpolarized light?

   g)   State two uses of ultrasonic waves.

   h)   State the first law of thermodynamics.

Q2) Attempt **any four** of the following :   **[4 × 4 = 16]**

   a)   Explain the role of physics in life sciences.

   b)   With the help of a suitable diagram, Explain construction and working of a hydraulic lever.

   c)   A refrigerator works under reversible cycle between temperatures $177°c$ to $327°c$.

      Calculate the   i)   thermal efficiency

                       ii)   coefficient of performance

d) The length of an organ pipe at one end is 0.6 m. If the velocity of sound in air is 330 m/sec, then what will be the fundamental frequency of pipe.

e) Explain the concept of pressure energy.

f) What is biomagnetism? How it is useful in health care? Discuss with example.

Q3) Attempt **any four** of the following : **[4 × 4 = 16]**

a) List various scales of temperature and compare them.

b) Write a note on Reynold's number.

c) A current of 10 n A is established in a circular loop of radius 5 cm. Find the magnetic dipole moment of current loop.

d) State Coulomb's law of electrostalic force between two electrical charges.

Two point charges of 2 μ c are separated by a distance of 0.5m in air. Calculate the force of interaction between them.

Given $\dfrac{1}{4\pi\varepsilon_\circ} = 9 \times 10^9 \, Nm^2\!\big/\!C^2$

e) Write a note on applications of Doppler effect.

f) Describe carnot's engine with suitable diagram.

Q4) Attempt **any two** of the following **[2 × 8 = 16]**

a) Explain the terms

    i) Spontaneous emission

    ii) Stimulated emission

    iii) Optical pumping

    iv) Population inversion

b) Derive Poiseuille's for determination of rate of flow of liquid flowing through a capillary.

c) Define

    i) Electric Intensity

    ii) Electric Potential

    iii) Electric lines of force

    iv) Electric flux

d) What are the properties of an ideal refrigerent? Give the application of refrigeration to biotechnology.

Q5) Attempt the following : **[2 × 8 = 16]**

a) Derive relation between three elastic moduli Y, K and n

$$\frac{9}{Y} = \frac{1}{K} + \frac{3}{n}$$

b) i) Distinguish between p type and n type semiconductor.

    ii) State Newton's law of viscosity. Define Co-efficient of viscosity and obtain its unit.

<div align="center">OR</div>

a) Define surface tension.

Explain capillary action with the help of a suitable diagram. Derive an expression for surface tension in capillary action.

b) Show that the entropy of a system remains constant in an adiabatic change. Calculate the change in entropy when 8gm of ice 0°c is converted into water at the same temperature. The latent heat of ice is 80 cal/gm.

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[4619] - 21

S.Y. B.Sc. (Semester - II)
BIOTECHNOLOGY
Bb - 221 : Environmental Biology and Biotechnology
(2008 Pattern)

Time : 3 Hours]   *[Max. Marks : 80*

Instructions to the candidates :

    1)   *All questions are compulsory*

    2)   *Figures to the right indicate full marks*

    3)   *Draw neat and labelled diagrams wherever necessary*

Q1) Answer the following in 2 - 3 sentences   **[10×2=20]**

    a)   Eco System

    b)   Food web

    c)   Homeostasis

    d)   Net primary productivity

    e)   Heterotrophs.

    f)   Grazing food chain

    g)   Green house effect

    h)   Hazardous wastes

    i)   Allogenic succession

    j)   Eutrophication

Q2) Write short notes **(any three)**   [3×5=15]

    a)   Liebig's law of minimum

    b)   Carbon cycle

    c)   Stratification of ecosystem

    d)   Pyramid of energy

Q3) a)   Describe the succession and the seral stages in a hydrosere.   **[7]**

    b)   Explain the methods of biodegradation of pesticides in the environment.**[8]**

Q4) Answer the following questions **(any three)**   [3×5=15]

    a)   What is photochemical smog ? How is it caused ?

    b)   Short note on biotransformation of plastics.

    c)   Explain briefly the disposal of biomedical wastes.

    d)   With suitable examples, explain bioremediation.

Q5) a)   Write methods of preserving meat and meat products in detail to avoid spoilage   **[7]**

    b)   Give a detailed description of the causes of water pollution.   **[8]**

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[4619] - 23

S.Y. B.Sc. (Semester - II)
BIOTECHNOLOGY
Bb - 223 : English
(2008 Pattern)

Time : 3 Hours]   *[Max. Marks : 80*

Instructions to the candidates :

1) *All questions are compulsory.*

2) *Figures to the right indicate full marks.*

Q1) a) Read the passage carefully and answer the questions given.

Pasteur found that many diseases are due to tiny living creatures and germs, which dwell in and feed on living bodies and poison them. There are millions of germs living in our body, in clothes we wear and in the food we eat. If we are well and strong, they do not usually do us any harm; but if we are tired or run-down, the germs can attack us and make us ill. In particular, if we cut ourselves, the germs can make their way into the cut and poison us. Now, Pasteur's discovery was important because it taught doctors that one of best ways of curing disease was to find out the nature of the attacking germs that cause the disease and then to kill them or help the body to kill them. Even more important, doctor takes immense trouble to wash his hands and the instruments he is going to use, and he not only washes them but also boils them. This is called sterilising them, and the object is to kill the germs with which the instruments are infected; for dirt of any kind is a great germ carrier.

Questions :

  i)   What did Pasteur discover about the causes of many diseases ?**[2]**

  ii) What makes the body an easy prey to such diseases ?   **[2]**

  iii) What is the importance of Pasteur's discovery in the prevention and treatment of infectious diseases ?   **[2]**

  iv) What is meant by sterilisation ? Why do the doctors do that ? **[2]**

  b) Expand **any one** of the following ideas into fifteen sentences.   **[8]**

  i)   Make hay while the sun shines.

  ii) Too many cooks spoil the broth.

Q2) a) Attempt the following.

  i) Give noun forms of the following words. **(Any four)** **[2]**

      Imagine, stationary, dangerous, inform, civilize

  ii) Give verb forms of the following words. **(Any four)** **[2]**

      Conversation, accommodation, receptive, attendance, connection

  iii) Give adjective forms of the following words. **(Any four)** **[2]**

      Mathematics, satisfy, avoid, narrate, success

  b) Provide one word for the following groups of words. **(Any four)** **[4]**

  i) A set of instructions that tells how to cook a food item

  ii) A substance added to soil that helps plants grow fast and better

  iii) A place where collections of books, journals, newspapers, etc. are kept for reading and study

  iv) A person whose job is concerned with politics, especially an elected member of a governing body

  v) A device that is attached to people to make them fall slowly and safely from an aircraft

  c) Use correct forms of verbs and complete the sentences. **(any four) [4]**

  i) She (suffer) from headache regularly.

  ii) Sujeet (have+calculate) the cost of interior decoration.

  iii) They were (arrange) for a meeting.

  iv) You must have (draw) the map.

  v) My friend (practice) cricket every day.

  d) Use articles *a, an, the* and complete the paragraph. **[2]**

      I have ---- great fascination for social and cultural functions. ------ annual social function of our college was held ----- few weeks ago. There was ----- interesting programme for all faculty.

Q3) a) Write an analytical paragraph on the basis of the following data. **[8]**

Weather in Pune

Date	Temperature (Degree Celcius)		Rainfall (mm)
	Max.	Min.	
25/08/14	32.08	24.06	60
26/08/14	27.05	22.05	20
27/08/14	26.02	22.04	00
28/08/14	26.04	20.02	10
29/08/14	33.05	25.05	80
30/08/14	32.04	24.00	70

b) Write a paragraph describing the procedure for Apical meristem culture in 12 to 15 sentences. **[8]**

OR

b) Write a review of a book that you read recently. **[8]**

Q4) a) Make a précis of the following paragraph to its one third length. Suggest a suitable title. Provide a rough draft also. **[8]**

Natural curiosity of man has produced material civilisation and has added immensely to the storehouse of our knowledge. In modern times this desire for knowledge is expressed in our pursuit of science. The exploration of geographical world is now almost complete, but the spirit of scientists lives in those who explore the inside of atoms or the complicated molecules from which the living things are made.

At first sight modern science seems to be complicated mixture of fact and fancy. Carefully observed and established facts, the results of experiments made with great precision and the pictures of the way nature works are found as a large volume of speculation. This building up of hypothesis from the cold facts is the very spirit of science. A guess leads to experiments to prove it and so the truth is slowly sorted out. Speculations which stretch out beyond existing knowledge are exciting and exhilarating. So long as we do not take them too seriously, they provide one of the best examples of the working of the human intellect. It is the duty of science to make these guesses, and test them in every possible way by experiment and observation, rejecting ruthlessly those which prove false or incomplete.

b) Punctuate the following sentences. **[8]**

    i) nikita asked who took my notebook

    ii) how fantastic my stay was in goa exclaimed surendra

    iii) rajesh came to me and said i have read the book wings of fire

    iv) supriya when shall i go asked sanjana.

OR

b) As a secretary of your class prepare a report of a visit to National Inatitute of Virology, Pune. **[8]**

Q5) a) Write a letter to the Senior Traffic Inspector of your town making him suggestions about traffic control. **[8]**

b) Form one word each with the following prefixes and suffixes. **[8]**

Prefixes : in-; dis-; multi-; inter-

Suffixes : -or;- ary;- ment; -less

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[4619] - 24

S.Y. B.Sc. (Semester - II)
BIOTECHNOLOGY
Bb :224 : Metabolic Pathways
(2008 Pattern)

Time : 3 Hours]   *[Max. Marks : 80*

Instructions to the candidates :

    1)   *All questions are compulsory.*

    2)   *Figures to the right indicate full marks.*

    3)   *Draw neat and labelled diagrams wherever necessary.*

Q1) Answer the following in 2 -3 sentences.   **[10×2=20]**

    a)   Why NADPH is referred to as reducing power ?

    b)   Name the coenzyme used by carboxylase energy.

    c)   Write fates of pyruvate.

    d)   What is de novo pathway ?

    e)   Define spontaneous reaction.

    f)   What is phenylketonuria ?

    g)   Contrast between NAD^+ & FAD^+.

    h)   Write a reaction catalysed by phosphorylase

    i)   Define Feedback inhibition.

    j)   Enlist enzymes taking part in glyoxylate pathway.

Q2) Answer the following (any three) [3×5=15]

    a) Describe chemiosmotic hypothesis.

    b) Justify C_2 pathway is wasteful pathway of energy.

    c) Explain "Anapleurotic reactions are fill in reactions.

    d) Describe pyruvate dehydrogenase complex (PDH)

Q3) Write a short notes on the following (any three) [3×5=15]

    a) Reciprocal regulation of gluconeogenesis.

    b) Ultrastructure of Mitochondria.

    c) Explain C_3 pathway.

    d) Transaldolase and transketolase reactions.

Q4) a) Derive the equation For Lineweaver - Burk plot. [8]

    b) Describe biosynthesis of fatty acid. [7]

<div align="center">OR</div>

    a) Explain glycogenesis and write a note on its regulation. [8]

    b) Explain in detail 'Z' scheme of photosynthesis. [7]

Q5) a) Discuss Non-oxidative phase of HMP pathway with its significance. [8]

    b) Describe urea cycle and its regulation. [7]

<div align="center">OR</div>

    a) Explain multiprotein complexes in electron transport chain (ETC). [8]

    b) Describe salvage pathway for purine and pyrimidine nucleotides. [7]

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[4619] - 3
F.Y. B.Sc.
BIOTECHNOLOGY
Bb - 103 : Basic Biosciences
(2008 Pattern)

Time : 3 Hours]   *[Max. Marks : 80*

Instructions to the candidates :-

    1)   *All questions are compulsory.*

    2)   *Draw neat & labelled diagram wherever necessary.*

    3)   *Answers to the sections should be written in two separate answer books.*

    4)   *Figures to the right indicate full marks.*

SECTION - I
(Botany)

Q1) Answer the following questions :   **[8]**

    a)   Explain sorosis type of fruit.

    b)   Give two biotechnologically important pteriodophytes.

    c)   Explain terrestrial plants with example.

    d)   Define phylloclade with example.

    e)   Explain lateral meristem.

    f)   What is photoperiodism.

    g)   Give function of stomata.

    h)   Give key characteristics of plant cell.

Q2) Write short notes on :   **[12]**

    a)   Meristematic tissue

    b)   Gibberellins

    c)   Reproduction in pteriodophytes

    d)   Thallamus of flower

    e)   Rote of phytochrome in flower initiation

P.T.O.

Q3) Attempt <u>any two</u> of the following   **[10]**

   a)   Describe dark reaction in plants.

   b)   Explain the mechanism of vernalization.

   c)   What is seed germination. Note on factors affecting germination.

Q4) Attempt the following.   **[10]**

Describe key features of fungi and describe its reproduction with suitable diagram.

<center>OR</center>

What is flower? Note on Androecium.

<center>

SECTION - II

(Zoology)
</center>

Q5) Answer the following :   **[8]**

   a)   Write any two characteristics of phylum porifera.

   b)   Define Endoparasite.

   c)   Enlist two characteristics of Reptilia.

   d)   Enlist two useful insects of commercial value.

   e)   What is Royal jelly?

   f)   Write two names of protozoan parasites.

   g)   Give two respiratory organs in vertebrates.

   h)   What is host specificity?

Q6) Write short notes on (Any three)   **[12]**

   a)   Characteristics of phylum Mollusca.

   b)   Sericulture.

   c)   Control measures of Malaria.

   d)   Morphology of Honey bee.

Q7) Answer the following (Any two) [10]

    a)   Comparative account on circulatory system in animals.

    b)   Parasitic adaptations of Nematodes.

    c)   Describe aquaculture.

Q8) Attempt the following. [10]

Describe in detail life pattern of protozoan parasites.

<div align="center">OR</div>

Write an essay on adaptations and economic Importance of earthworms.

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Total No. of Questions : 7]

SEAT No. : ☐

P177

[Total No. of Pages : 2

[4619] - 31
T.Y.B.Sc.
BIOTECHNOLOGY
Bb - 331 : Microbial Biotechnology
(Semester - III) (2008 Pattern)

Time : 3 Hours]

[Maximum Marks : 80

Instructions to the candidates:

   1)   Question No. 1 is compulsory.

   2)   Attempt any four of the remaining questions.

   3)   Draw neat labelled diagram wherever necessary.

   4)   Figures to the right indicate full marks.

Q1) Answer all questions in 2 - 4 lines.   **[20]**

   a)   What are Koch postulates?

   b)   Give the significance of ED pathway.

   c)   Describe ropiness in milk.

   d)   Give the significance and examples of normal flora of the gastro - intestinal tract.

   e)   What are F Plasmids?

   f)   Give the significance of BOD in waste water treatment.

   g)   What are Chemo organo trophs? Enlist any two examples.

   h)   What is Y_{ATP}?

   i)   Give the role of strepto cocci as indicator of faecal pollution.

   j)   Solve the following :-

       Bacillus sp. is used for the production of amylase enzyme. After fermentation, 200 mg amylase (in terms of protein) was obtained.

       If the biomass produced was 4 gms, Calculate the $q_{p/x}$

Q2) a)   What are halophiles? Explain the adaptations of halophiles.   **[7]**

     b)   Define Batch culture. Explain using suitable equations the relevance of u, y, S_R, S, K_S and u_{max} in relation to batch culture.   **[8]**

P.T.O.

Q3) a) Auxotrophic mutants play a significant role in strain improvement. Explain with a suitable example. **[8]**

b) Discuss the application of interrupted mating in gene mapping. **[7]**

Q4) a) Enlist different viral and bacterial diseases of the nervous system. Explain any one w.r.t pathogenesis, treatment and preventive measures. **[8]**

b) Describe the characteristics of an ideal chemotherapeutic agent. **[7]**

Q5) a) Define pasteurization. Comment whether pasteurization is a method of sterilisation. Describe the tests used for checking the efficiency of pasteurisation. **[8]**

b) Describe the colour and flavour defects of milk. **[7]**

Q6) a) Explain Anaerobic Digester with reference to **[10]**

i) Diagram and working

ii) Phases involved

iii) Organisms involved in each phase.

b) Define coliforms. Why are coliforms used as indicator bacteria in assessing the potability of water. **[5]**

Q7) Write short notes on [Any three] **[15]**

a) GMO's in agriculture.

b) Growth quantification by turbidity measurement.

c) Botulism

d) Trp operon

e) Applications of thermophiles in biotechnology.

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[4619] - 32

T.Y. B.Sc. (Semester - III)
BIOTECHNOLOGY
Bb :332 : Animal and Plant Development
(2008 Pattern)

Time : 3 Hours]   *[Max. Marks : 80*

Instructions to the candidates :

1) *Answer to each section should be written in separate answer book.*

2) *Question No 1 from each section is compulsory.*
   From remaining questions attempt any two from each section.

SECTION - I

(Animal Development)

Q1) Explain the terms :   **[10]**

    a)   Stem cells

    b)   Differentiation

    c)   Capacitation

    d)   Homeotic genes

    e)   Spemann's organizer

Q2) a)   Describe the process of oogenesis and with the help of neat labelled diagram explain the structure of female gamete.   **[7]**

    b)   Describe the cleavage patterns on the basis of quantity & distribution of yolk.   **[8]**

P.T.O.

Q3) a) Describe the process of fertilisation and give its significance. **[8]**

b) With the help of model system Drosophila / any other system (animal) explain the role of maternal genes in patterning. **[7]**

Q4) Write short notes on : **[15]**

a) Cell lineage

b) Cloning in animals

c) Morphogenetic movements

SECTION - II

(Plant development)

Q5) Explain the term with respect to plant development **[10]**

a)` Periclinal chimera

b) Monopteros gene

c) Mega sporogenesis

d) Dedifferentiation

e) Developmental plasticily inplants

Q6) a)` With the help of diagra discuss the embryonic development in monocolyleadons. **[8]**

b) Describe in detail the ABC model of floral patterning. **[7]**

Q7) a)` Define plant hormones and discuss role of gibberellic acid and abscisic acid in detail **[8]**

b) Describe the short and root patterning in plants. **[7]**

Q8) Write notes on. **[15]**

a) Somatic embryogenesis

b) Hobbit gene

c) Quiescent centre

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[4619] - 33
T.Y. B.Sc. (Semester - III)
BIOTECHNOLOGY
Bb - 333 : Biodiversity and Systematics
(2008 Pattern)

Time : 3 Hours]   *[Max. Marks : 80*

Instructions to the candidates :
1) *Q. 1 is compulsory*
2) *Out of remaining questions attempt any four*
3) *Figures to right indicate full marks*

Q1) Answer the following in 2 -4 lines   **[10×2=20]**

a) Define with example ecological natality

b) Define clade.

c) Enlist environmental conditions whereby ex-situ conservation is preferred over in-situ conservation.

d) Enlist importances of life tables.

e) Define : Hypervolume niche

f) Differentiate between Ecad and ecotype.

g) Define α-diversity

h) compare phylogeny and outogeny

i) Enlist Reddatabook catagories of organisms.

j) Why Altruism is considered as an important social behaviour ?

P.T.O.

Q2) a) Give an account of bioprospecting of plants with suitable example. **[8]**

b) Elaborate on outline classification of kingdom Monera. **[7]**

Q3) a) Explain in detail interactions amongst organisms in nature. **[8]**

b) Give an account of strategies used for conservation of biodiversity **[7]**

Q4) a) Write minutes of the wildlife (Conservation) Act, 1972. **[8]**

b) What is 'biodiversity hotspot' ? Elucidate on megabiodiversity hotspots of world. **[7]**

Q5) a) Write a note on importance of cytology in classification of organisms.**[8]**

b) Explain steps involved in fattyacid methyl esterases [FAME] analysis. Add a note on its significance in classification of bacteria. **[7]**

Q6) a) What is species diversity index ? Enlist biodiversity indices. Add a note on its Applications. **[8]**

b) Explain age structure of population and describe characteristics of stable population. **[7]**

Q7) Write notes on - (any three) **[15]**

a) Phage typing.

b) Circadian rhythm

c) Phytogeography of India

d) Importance of biodiversity as industrial raw material.

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[4619] - 4
F.Y. B.Sc.
BIOTECHNOLOGY
Bb - 104 : Mathematics and statistical Methods for Biologists.
(2008 Pattern)

Time : 3 Hours]   *[Max. Marks : 80*

Instructions to the candidates :-

1) *All questions are compulsory.*
2) *Figures to the right indicate full marks.*
3) *Use of non - programmable scientific calculator is allowed.*
4) *Solve each section on separate answer paper.*

SECTION - I

(Mathematics)

Q1) Attempt each of the following   **[5 × 2 = 10]**

a)   Find real and imaginary parts of $\dfrac{1+i}{2+i}$

b)   If $Z = \tan^{-1}\dfrac{x}{y}$ the find $Zx + Zy$.

c)   Discuss the convergence of the series $\displaystyle\sum_{n=1}^{\infty}\dfrac{n+1}{5n+3}$

d)   Find adjoint of the matrix $A = \begin{bmatrix} 1 & 0 & 1 \\ 2 & 1 & -1 \\ 0 & 5 & 2 \end{bmatrix}$

e)   Write degree and order of the differential equation.

$$\frac{dy}{dx} = \sqrt{1 + 4\frac{d^2 y}{dx^2}}$$

Q2) Attempt any four of the following   [4 × 2½ = 10]

   a)   Find stationary points for the function $f(x, y) = 2(x^2 - y^2) - x^4 + y^4$.

   b)   Find rank of the matrix

$$A = \begin{bmatrix} 1 & -3 & 2 & -3 \\ 2 & 0 & 1 & 3 \\ -2 & -4 & 1 & -9 \\ 1 & 3 & -1 & 6 \end{bmatrix}$$

   c)   Solve : $x^3 - x^2 + x - 1 = 0$

   d)   Examine the convergence of the series $\sum_{n=1}^{\infty} \left(\frac{n}{n+1} \right)^{n^2}$

   e)   Check for exactness and hence solve the following differential equation.

$(y \cos x + \sin x \cos x) \, dx + \sin x \, dy = 0$

   f)   Check whether the set

$\{(1,0,0), (0,2,1), (2,0,1)\}$ is dependept in $\mathbb{R}^3$.

Q3) Attempt any two of the following   [2 × 5 = 10]

   a)   Solve the following system of linear equations

$2x + y + z = 10$

$3x + 2y + 3z = 18$

$x + 4y + 9z = 16$

   b)   Solve : $\dfrac{dy}{dx} = \dfrac{x - y}{x + y}$

   c)   Show that the following sequence is convergent

$\sqrt{7}, \sqrt{7\sqrt{7}}, \sqrt{7\sqrt{7\sqrt{7}}}, \ldots$

Q4) Attempt any one of the following. **[1 × 10 = 10]**

a) Determine whether the matrix A is diagonalizable. If so, find P and P^{-1} AP

$$\begin{bmatrix} 4 & 6 & 6 \\ 1 & 3 & 2 \\ -1 & -4 & -3 \end{bmatrix}$$

b) i) Using DeMoivre's theorem show that

$$\sin^5 \theta = \frac{1}{16}[\sin 5\theta - 5\sin 3\theta + 10\sin \theta]$$

ii) Using $\in$ - definition show that

$$\lim_{n \to \infty} \frac{1}{n^2 + 1} = 0$$

SECTION - II

(Statistics)

Q5) Attempt the following : **[5 × 2 = 10]**

a) Define standard deviation.

b) Explain the term - equiprobable sample space.

c) Compute median for the following data:

24, 28, 12, 36, 48, 14, 15.

d) State any two properties of correlation coefficient.

e) Define - level of significance.

Q6) Attempt any four : **[4 × 2½ = 10]**

a) Define - binomial distribution and state additive property of binomial distribution.

b) Define - skewness. Explain any two types of skewness.

c) For poisson distribution with mean 5, find P $(x \geq 1)$ Also state its variance.

d) Find arithmetic mean for the following data :

class interval	0-10	10-20	20-30	30-40	40-50
Frequency	5	12	20	10	3

e) IF P(A) = 0.5, P(B) = 0.4, P(A∩B) = 0.3, find P(A∩B^c), P(A^c∩B^c).

Q7) Attempt any two :   [2 × 5 = 10]

a) Define multiple correlation coefficient, partial correlation coefficient and compute $r_{12.3}$, $R_{1.23}$ if $r_{12} = r_{13} = r_{23} = 0.5$.

b) For a random sample of size 64 sample mean and variance are 42.5 and 4 respectively. At 5% level of significance can we conclude that population from which sample is selected has mean 42.

c) Explain the procedure for testing the independence of two attributes.

Q8) Attempt any one :   [1 × 10 = 10]

a) x_i and y_i denotes weights in kg. of two types of brands.

x_i :   0.92   0.94   0.96   0.90   0.89

y_i :   0.88   0.87   0.89   0.92

At 5% Level of significance test whether average weight donot differ significantly.

b) For the following data :

n = 20, $\bar{x}$ = 20, $\bar{y}$ = 45, Var (x) = Var (y) = 10.8

rxy = 0.96

find

i)   Calculate Coefficient of Variation of y.

ii) Vegression Coefficients.

iii) Vegression Lines.

iv) Estimfimate y for x = 18.

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[4619] - 41

T.Y. B.Sc. (Semester - IV)
BIOTECHNOLOGY
Bb - 341 : Large Scale Manufacturing Process
(2008 Pattern)

Time : 3 Hours]　　　　　　　　　　　　　　　　*[Max. Marks : 80*

Instructions to the candidates:

   1)　Question number 1 is compulsory.

   2)　Answer any four questions from remaining.

   3)　Neat labelled diagrams must be drawn wherever necessary.

   4)　Figures to the right indicate full marks.

Q1) Answer all questions in 2 - 4 lines :　　　　　　　　**[10 × 2 = 20]**

   a)　What is Scale Up?

   b)　Discuss the role of chromium, nickel and molybdenum in steel used for construction of fermentor.

   c)　Define energy balance.

   d)　What is solid substrate fermentation? Give two examples of substrates used for solid substrate fermentation?

   e)　What is Del factor?

   f)　Name any two organisms used for the industrial production of antibiotics.

   g)　Define On-line Sensors. Give one example.

   h)　Name any two fermentors used for cultivation of animal cells.

   i)　What is cross flow filtration?

   j)　Define Amortized cost.

P.T.O.

Q2) a) Explain with the help of flow diagram, the large scale production of Ethanol with reference to : **[10]**

 i) Production strain

 ii) Fermentation medium and environmental conditions

 iii) Down stream processing.

 b) What is whole broth processing? Comment on its application. **[5]**

Q3) a) Describe the production of Single Cell Protein. Comment on the advantages and disadvantages of use of single cell protein. **[8]**

 b) Discuss the different methods of pressure measurement during fermentation and add a note on pressure control in fermentors. **[7]**

Q4) a) Compare and contrast between batch and continuous sterilization. **[8]**

 b) Explain giving examples different types of carbon sources used in large scale fermentation. **[7]**

Q5) a) Explain the different types of solvent extraction techniques used for product recovery giving suitable examples. **[10]**

 b) What is Quality Assurance in fermentation industry? What are the responsibilities of Quality Assurance department? **[5]**

Q6) a) Explain with a suitable diagram, the construction and working of a classical submerged fermentor. **[8]**

 b) Discuss the effect of aeration, agitation and microbial biomass on $K_L a$ of a fermentor. **[7]**

Q7) Write short notes on : (any three) **[15]**

 a) Fed batch culture

 b) Pyrogen testing

 c) Effect of raw material on fermentation economics.

 d) Diagrammatically represent Air Lift (Internal loop) fermentor.

 e) Immobilized cells / enzymes.

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[4619] - 42

T.Y. B.Sc. (Semester - IV)
BIOTECHNOLOGY

Bb :342 : Biotechnology in Agriculture and health.
(2008 Pattern)

Time : 3 Hours] *[Max. Marks : 80*

Instructions to the candidates :

1) *Answer to each section should be written in separate answer book.*

2) *Question No. 1 and Q. 5 is compulsory.*

3) *From remaining question attempt any two from each section.*

Section - I

(AGRICULTURE)

Q1) Define or explain the following term **[10]**

a) Cybrids

b) Electroporation

c) QTL

d) Trade marks

e) Cryopreservation

Q2) a) What is patent ? explain the procedure of filling a patent with suitable examples **[8]**

b) Describe different stages of micropropagation & a note on its application **[7]**

Q3) a) Describe different methods of agrobacterium mediated genetic transformation **[8]**

b) Define molecular markers ? Give their application in AFLP analysis **[7]**

Q4) Write short notes on : (any three)   **[15]**

    a)   Secondary metabolites from plants

    b)   Risk assessment of GM product

    c)   Green house technology

    d)   DNA banking of Germplasm.

Section - II
(HEALTH)

Q5) Attempt the following   **[10]**

    a)`   Define IVF.

    b)   Enlist the applications of tissue engineering.

    c)   Name any four molecular markers currently in use.

    d)   Write significance of organ culture.

    e)   What is the role of serum in animal cell culture.

Q6) a)`   Explain RFLP in detail   **[7]**

    b)   Describe PCR and its applications   **[8]**

Q7) a)`   Discuss the role of epidemiology in public health.   **[8]**

    b)   Describe any four recombinant products available for human health **[7]**

Q8) Write short notes on.   **[15]**

    a)   Hybridoma

    b)   Biosensors

    c)   cell cloning.

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[4619] - 43

T.Y. B.Sc. (Semester - IV)
BIOTECHNOLOGY
Bb - 343 : Recombinant DNA Technology
(2008 Pattern)

Time : 3 Hours]

[Max. Marks : 80

Instructions to the candidates:

1) *Question 1 is compulsory.*
2) *Attempt any 4 out of the remaining questions.*

Q1) Answer in 2-4 lines. **[20]**

a) State the role of polynucleotide kinase in molecular cloning.

b) What is difference between probe and primer?

c) Define shuttle vector.

d) Mention the role of SDS in nucleic acid purification.

e) Give four applications of recombinant DNA technology.

f) Write any four milestones in genetic engineering.

g) What is insertional inactivation?

h) Enlist the steps used in cell lysis.

i) State the significance of the ratio of absorbance at 260 and 280.

j) Name the membranes used in blotting.

Q2) Explain in detail Maxam-Gilbert method of DNA sequencing. **[15]**

Q3) a) Elaborate any one method of construction of genomic library. **[8]**

b) Explain DNA finger printing. **[7]**

P.T.O.

Q4) a) What are YAC vectors? How are they superior to BAC vectors? **[8]**

b) Describe type II restriction endonucleases with reference to the recognition sites, cut pattern and their applications in genetic engineering. **[7]**

Q5) Write short notes on : **[15]**

a) Northern blotting

b) Alkaline phosphatases

c) DEPC

Q6) a) Describe RFLP in detail. **[8]**

b) Explain site-directed mutagenesis and its significance in molecular clonning. **[7]**

Q7) a) Describe the set of guidelines used in release of recombinant products.**[7]**

b) Discuss the steps involved in plasmid purification. **[8]**

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[4619] - 5

F.Y. B.Sc.

BIOTECHNOLOGY

Bb - 105 : Fundamentals of Biological Chemistry

(2008 Pattern)

Time : 3 Hours]   *[Max. Marks : 80*

Instructions to the candidates :

    1)   All questions are compulsory.

    2)   Draw neat and lebelled diagrams wherever necessary.

    3)   Figures to the right indicate full marks.

Q1) Attempt all the following :   **[8 × 2 = 16]**

    a)   What is an electrophile?

    b)   Explain the term rancidity.

    c)   An amino acid is a zwitter ion. Explain.

    d)   Define pH.

    e)   What is salting out of proteins?

    f)   What are co-enzymes?

    g)   What is a glycosidic bond?

    h)   What is energy of activation of an enzyme?

Q2) Answer any four of the following :   **[4 × 4 = 16]**

    a)   Describe a nucleophilic substitution with a suitable example.

    b)   Explain the induced fit hypothesis of enzyme action.

    c)   Describe the structure of t - RNA.

    d)   Differentiate between reducing and non - reducing sugars.

    e)   Give a brief account of methods of cell disruption.

Q3) Answer any four of the following :　　　　　　　　　　　　　　　**[4 × 4 = 16]**

　　a)　Describe isomerism types in monosaccharides.

　　b)　Explain the primary structure of a protein.

　　c)　Explain any two properties of fatty acids.

　　d)　Write a short note on thin layer chromatography (TLC).

　　e)　Give the role of thiamine and riboflavin in biological reactions.

Q4) Answer any two of the following.　　　　　　　　　　　　　　　**[2 × 8 = 16]**

　　a)　Classify amino acids on the basis of 'R' (side chain).

　　b)　Give an account of RNA and its types.

　　c)　Write an account of enzyme inhibition.

Q5) Answer any two of the following.　　　　　　　　　　　　　　　**[2 × 8 = 16]**

　　a)　Describe the Watson Crick model of DNA.

　　b)　Describe the forces stabilising secondary structure of protein.

　　c)　Classify carbohydrates on the basis of number of sugar units giving examples.

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[4619] - 6
F.Y. B.Sc.
BIOTECHNOLOGY
Bb - 106 : Biophysics and Instrumentation.
(2008 Pattern)

Time : 3 Hours]   *[Max. Marks : 80*

Instructions to the candidates :-

1) *All questions are compulsory.*
2) *Draw neat and lebelled diagrams whenever necessary*
3) *Figures to right indicate full marks.*
4) *Use of scientific calculator is allowed.*

Q1) Attempt all of the following   **[8 × 2 = 16]**

     a)   What are quantum numbers? Enlist them.

     b)   State Beer's law.

     c)   State basic properties of nucleus.

     d)   Give types of protein present in cell membrane.

     e)   What is thermistor state it's types.

     f)   What is RCF.

     g)   Define Resolving power of microscopes.

     h)   State drawbacks of Thomson atomic model.

Q2) Attempt any four   **[4 × 4 = 16]**

     a)   Calculate largest and shortest wavelength in Balmer series.

     b)   Describe hertz experiment to demonstrate electromagnetic wave in brief.

     c)   Give characteristics of alpha and beta rays.

     d)   Write a note on Action potential.

     e)   State advantages and disadvantages on thermocouple.

Q3) Attempt any four   **[4 × 4 = 16]**

   a) Discuss electromagnetic spectrum in Detail.

   b) Give characteristics of Beta and gamma rays.

   c) Write a note on compound microscope.

   d) Explain bimetallic thermometer.

   e) Calculate the speed of rotor in rpm if it is moving with the speed of 6000 g, when it's radius is...

      i)   10 cm

      ii) 7 cm

Q4) Attempt any two   **[2 × 8 = 16]**

   a) Describe in detail the fluid mosaic model.

   b) Explain the construction and working principle of colorimeter.

   c) Explain Nuclear magnetic Resonance spectrometer. in detail.

Q5) Attempt any one   **[1 × 16 = 16]**

   a) What do you mean by rigid rotator? Obtain Expression for energy of rigid rotator.

   b) Explain Radioimmuno Assay RIA with the help of following points.

      i)   Principle

      ii)   Mechanism

      iii) Advantages and Limitations.

      iv)   Applications.

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[4619] - 7

F.Y. B.Sc.

BIOTECHNOLOGY

Bb - 107 : Microbiology

(2008 Pattern)

Time : 3 Hours]   *[Max. Marks : 80*

Instructions to the candidates :

    1)   *All questions are compulsory.*

    2)   *Figures to the right indicate full marks.*

    3)   *Neat diagrams must be drawn wherever necessary.*

    4)   *All questions carry equal marks.*

Q1) Answer the following :   **[8 × 2 = 16]**

    a)   Enlist any 4 general characteristics of algae.

    b)   What is Mordant? Give its example.

    c)   What is enrichment media? Give example.

    d)   What is meant by mix culture?

    e)   What is wet mount?

    f)   Give use of Hot air oven in Microbiology.

    g)   What is theory of abiogenesis?

    h)   Draw and describe rhizoid colony.

Q2) Attempt any four :   **[4 × 4 = 16]**

    a)   State Koch's postulate for germ theory of disease.

    b)   Draw a neat labelled diagram of plant and animal cell.

    c)   A water sample was analysed and following data was obtained:

        i)   Volume of sample plated = 0.1 ml.

        ii)   Dilution of sample = 10^6

        iii)   Number of colonies obtained = 86

        Calculate TVC of the sample.

    d)   What is differential staining technique? Describe process of acidfast staining.

    e)   Describe in brief : Ectomycorrhiza.

    f)   Classify bacteria depending upon their O_2 requirement for growth.

Q3) Attempt any four :   **[4 × 4 = 16]**

    a)   Describe method of bacterial culture preservation using low temperature.

    b)   Describe pour plate method for isolation of bacteria.

    c)   Draw a neat labelled diagram of lysogenic cycle of bacteriophage.

    d)   State the physiological and metabolic characteristics used in bacterial classification.

    e)   Describe method of enumeration of bacteria using haemocytometer.

    f)   Enlist different physical agent for sterilization. Describe mechanism of action of U.V. radiation in sterilization.

Q4) Attempt any two :   **[2 × 8 = 16]**

    a)   Describe the process of nodulation in roots of leguminous plants.

    b)   Describe the process of sporulation in bacteria.

    c)   Distinguish between Prokaryotes & Eukaryotes.

Q5) Attempt any one :   **[1 × 16 = 16]**

    a)   Give an account of ultrastructure of Gram negative and Gram positive cell wall.

    b)   Classify bacteria depend on their carbon and energy source.

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[4619] - 8

F.Y. B.Sc.

BIOTECHNOLOGY

Bb - 108 : Use of Computers

(2008 Pattern)

Time : 3 Hours]   *[Max. Marks : 80*

Instructions to the candidates :-

1) *All questions are compulsory.*
2) *Figures to the right indicate full marks.*
3) *Neat diagrams must be drawn whenever necessary.*

Q1) Attempt all of the following.   **[8 × 2 = 16]**

a) What is real time system? Give one example of it.

b) State TRUE OR FALSE.

   i) Hard disk is a secondary memory.

   ii) Windows 98 is a single user operating system.

c) What is GUI?

d) How do you protect your system from virus?

e) Define the following terms :-

   i) WAN

   ii) MAN

f) What are the advantages of firewall?

g) Define the term "Bioinformatics".

h) Give advantage of star topology.

Q2) Attempt any FOUR of the following :   **[4 × 4 = 16]**

a) What is a computer? List and explain the characteristics of computer.

b) What are output devices? Explain working of laser printer.

c) What are various storage devices used in computer? compare them with respect to capacity and access time.

d) Define operating system. Explain its services.

P.T.O.

e)   Write a short note on

    i)   Bus topology

    ii)   Ring topology

Q3) Attempt any FOUR of the following :   **[4 × 4 = 16]**

a)   How to prepare piechart in MS-Excel? Explain with suitable example.

b)   What is DBMS? List and explain its basic functions.

c)   What is a relationship? Explain types of relationships.

d)   What is a search engine? Write a short note on Google search engine.

e)   Give features and advantages of linux operating system.

Q4) Attempt any TWO of the following :   **[2 × 8 = 16]**

a)   Write a short note on Menu Bar in MS-WORD.

b)   What are Biological databases? Explain any one in detail.

c)   Write a short note on :

    i)   Relational Model

    ii)   Network model

Q5) Attempt the following :   **[2 × 8 = 16]**

a)   Write an algorithm and draw a flowchart for fibonacci series.

<div align="center">OR</div>

Write an algorithm and draw a flowchart to check whether given number is armstrong number or not.

(eg 153 = $1^3+5^3+3^3$)

b)   What is flowchart? Why it is used? Describe various symbols used in a flowchart with example.

<div align="center">OR</div>

Write an algorithm and draw a flowchart for checking whether a given number is divisible by 5 and 7.

<div align="center">ⓘ ⓘ ⓘ ⓘ</div>

Seat
No.

T.Y. B.Sc. (Animation) (Semester – III) Examination, 2014
AN – 3101 : SCRIPT WRITING
(2011 Course)

Time : 2 Hours   Max. Marks : 40

Instructions : 1) **All** questions are **compulsory**.
2) Figures to the **right** indicate **full** marks.
3) **Neat** diagrams/ illustration must be drawn **wherever** necessary.

1. Answer the following questions :   **(1×10 = 10)**

   i) Name the line art animation masterpiece created by Winsor McCay in 1914.

   ii) What was the first fully CG TV series developed by mainframe entertainment in 1994 ?

   iii) Name 5 types of shows being done for an adult audience.

   iv) What is a springboard ?

   v) Name the animation produced by Mohan Bhavanani in 1935.

   vi) What is a literacy screenplay ?

   vii) What are the three main features of the poetic screenplay ?

   viii) What is the benefit of using a storyboard ?

   ix) What is an Animation Outline ?

   x) What is OTS ?

2. Answer **any two** out of the following.   **(2×5 = 10)**

   i) Describe in detail the production process of an animated movie.

   ii) Describe the traditional post production process in detail.

   iii) Name and explain the important points to be considered while writing a script for a stop motion movie.

   iv) Explain the importance of a theme in a story.

3. Answer **any two** out of the following.   **(2×5 = 10)**

   i) What is a Television presentation Bible ? Explain in detail.

   ii) Write in detail about what independent shorts are ?

   iii) Describe the preparation required for writing a script for television Animation.

   iv) Explain the structure planning while writing a story.

4. Answer **any two** out of the following.   **(2×5 = 10)**

   i) Explain in detail – comedy in Animation.

   ii) What is the purpose of a dialogue in Animation ?

   iii) What are the important points to consider while writing the final script ?

   iv) Explain the importance of dialogue in character introduction.

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Seat
No.

F.Y. B.Sc. (Animation) Examination, 2014
Paper – VI : MULTIMEDIA AND COMPUTER GRAPHICS
(2011 Course)

Time : 3 Hours   Max. Marks : 80

Instructions : 1) **All** questions are **compulsory**.
                  2) *Figures to the* **right** *indicates* **full** *marks.*
                  3) **Use** *of non programmable battery calculator is* **allowed**.

1. Attempt **any ten** of the following :   **(2×10=20)**

   a) What is signal bandwidth ?

   b) Explain Nyquist Sampling theorem.

   c) Define differential encoding and transform encoding.

   d) What is progressive mode and hierarchial mode ?

   e) What is BIFS ?

   f) What are the types of compressed frames ?

   g) Define Frame bursting and Frame Filtering.

   h) Write Full Form of the following.
      i) LAN   ii) PBX

   i) List 2 types of random scan display.

   j) Define convex polygon.

   k) Define Frame buffer.

   l) What are the two types of hidden surface algorithm ?

2. Attempt **any four** of the following.   **(5×4=20)**

   a) State the basic form of representation of
      i) Text
      ii) Image
      iii) Audio
      iv) Video.

   b) Write a note on run-length and statistical encoding.

   c) Explain the operation of a basic DPCM signal encoder and decoder with the aid of schematic diagram.

     d) Explain the meaning of the following terms related to CSMA / CD .
        i) Multiple access
        ii) Broadcast
        iii) Collision
        iv) Carrier sense.

     e) Explain RGB color mode with diagram.

3. Attempt **any four** of the following. **(5×4 = 20)**

     a) Write a note on Window-to-viewport mapping.

     b) Write a note on Sutherland - Hodgman algorithm.

     c) Explain the meaning of the following terms relating to a switched telephone network.
        i) Pots
        ii) Local exchange/end office
        iii) PBX
        iv) Mobile Switching Centre
        v) International gateway exchange.

     d) Explain the following terms related to transform encoding
        i) Spatial Frequency
        ii) Horizontal and Vertical Frequency Components
        iii) DCT.

     e) Explain how better sound quality for the same bit rate can be obtained using subband coding ADPCM with the help of schematic diagram.

4. Attempt **any four** of the following. **(5×4=20)**

     a) Draw the frame Format of Ethernet and explain the terms associated with each block.

     b) Write a note on CRT display monitor.

     c) Find the normalization transformation that maps a window whose lower left corner is at (1, 1) and upper right corner is at (3, 5) onto.

        i) A viewport that is the entire normalized device screen, and

        ii) A viewport that has lower left corner at (0, 0) and upper right corner $(^1/_2, \, ^1/_2)$.

     d) Write a note on Geometric transformation.

     e) Explain the meaning of the following operational mode of communication channel :- Simplex, half-duplex, duplex, broadcast, multicast, asymmetric and symmetric.

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Seat No.	

F.Y. B.Sc. (Animation) Examination, 2014
ELEMENTS OF INFORMATION TECHNOLOGY (Paper – I)
(2011 Course)

Time : 3 Hours   Max. Marks : 80

*Instructions : 1) **All** questions are **compulsory**.*
*2) Figures to the **right** indicate **full** marks.*
*3) **Neat** diagrams must be drawn **wherever** necessary.*

1. Attempt the following (**any ten**).   **(2×10=20)**

   a) What are the five basic function by computer system ?

   b) What is volatile memory ?

   c) What is need of memory in computer ?

   d) What is computer ?

   e) What is sequential access memory ?

   f) What is defalt extension of following file ?
      I) File created by Notepad.
      II) File created by Paintbrush.

   g) Why HTML is used ?

   h) Explain <img> tag with example.

   i) What is Web browser ?

   j) What is tag ? Explain in detail.

   k) What is use of < br> tag in HTML ? Give its example.

   l) How do you put message in Web browser status bar ?

2. Attempt the following (**any four**).   (**5×4=20**)

   a) Explain primary memory in brief.

   b) Write a note on Plotter.

   c) Explain control panel in Ms Windows.

   d) Explain structure of HTML program with example.

   e) What are advantages and disadvantages of HTML ?

3. Attempt the following (**any four**): **(5×4=20)**

   a) Explain assembly language.

   b) What is algorithm ? Write an algorithm to add first 20 integers start from 1.

   c) Define an operating system. Explain types of operating system.

   d) Explain <FRAME> & <FRAMESET> tags in HTML.

   e) What is list tag ? Explain different attributes of list tag.

4. Attempt the following (**any four**). **(5×4=20)**

   a) Draw a flowchart to compute and print simple interest.

   P = Principal amount

   R = Rate of in %

   T = Time in year.

   b) Draw a flowchart for printing maximum of three distinct number.

   c) Draw a flowchart to find factorial of any number.

   d) Write html code for the following.

A	B	C
E	f	g
	h	i
M	N	O

   e) Create html application for demo of <img> tag.

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Seat
No.

S.Y. B.Sc. (Animation) (Semester – I) Examination, 2014
AN – 2101 : TECHNICAL ENGLISH – I
(2011 Course)

Time : 2 Hours   Max. Marks : 40

Instructions : 1) **All** questions are **compulsory**.
2) Figures to the **right** indicate **full** marks.

1. Answer the following questions :   **(1×10=10)**
   a) Define Technical English.
   b) Why is Technical Writing essential in the workplace ?
   c) What is the meaning of conflict resolution in a team ?
   d) Name different type of Audiences in Technical Writing.
   e) What are the benefits of an efficient team ?
   f) What is secondary data in research of technical writing ?
   g) What is drafting ?
   h) What are the characteristics of Technical English ?
   i) Name the essential elements for a letter of appeal.
   j) Define Target Audience.

2. Answer **any two** out of the following :   **(2×5=10)**
   a) Explain summaries and abstract in detail.
   b) Importance of Technical Writing in a workplace.
   c) Define and explain different audience levels.
   d) Why is re-writing necessary ?

3. Answer **any two** out of the following :   **(2×5=10)**
   a) Importance of Grammar in Technical English.
   b) Explain academic writing in detail.
   c) What are different types of letters ?
   d) Describe in detail the format of a letter.

4. Answer **any two** out of the following :   **(2×5=10)**
   a) Explain an e-mail with an example.
   b) What are multicultural effects on a workplace ?
   c) What is pre-writing ?
   d) What ethics are essential in Technical Writing ?

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Seat
No.

S.Y. B.Sc. (Animation) (Semester – I) Examination, 2014
AN – 2106 : PRODUCTION PROCESS – I
(2011 Course)

Time : 2 Hours   Max. Marks : 40

Instructions : 1) **All** questions are **compulsory**.
2) Figures to the **right** indicate **full** marks.
3) **Draw** illustrations **wherever** required.

1. Answer the following questions.   **(10×1=10)**
   a) What is full form of 'B.G.' ?
   b) What is 'Period' in research ?
   c) What is character 'Bio-graphy' ?
   d) What is costume in character design ?
   e) What is 'Society' in research ?
   f) What is pictorial representation of story ?
   g) How many views contain 2D model sheet ?
   h) Name the different elements in character bible.
   i) What is story ?
   j) What is fullform of 'M.G.' ?

2. Answer the following question **(any 2)**.   **10**
   a) What is script writing ? Explain in brief.
   b) Explain layouts. And there are use.
   c) Write a note on 'Anthropomorphise character'. Give any one example.
   d) Explain different elements in a story.

3. Answer the following questions **(any 2)**.   **10**
   a) What is extreme poses ? Explain brief with example.
   b) Explain in brief character construction of 'Mickey Mouse'.
   c) Explain the importance of colour keys in B.G. Design.
   d) Explain character proportion in brief.

4. Answer the following questions **(any 2)**.   **10**
   a) Explain 'Outline' in story writing.
   b) Explain 'Turn around' in brief with suitable example.
   c) Explain in brief any 5 types of different expressions with examples.
   d) Explain in brief flow chart of pre-production with example.

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Seat
No.

F.Y. B.Sc. (Animation) Examination, 2014
INTRODUCTION TO PROGRAMMING
Language : 'C' Programming
(Paper – II) (2011 Course)

Time : 3 Hours   Max. Marks : 80

*Instructions : 1) **All** questions are **compulsory**.*
*2) Figures to the **right** indicate **full** marks.*
*3) Write a proper code **wherever** necessary.*

1. Attempt the following (**any ten**) :   **(2×10=20)**

   a) What are the three constant used in C ?

   b) Explain putchar ( ) function.

   c) Explain any two escape sequence character in C.

   d) What will be the output of following program :

      int m = 1, n = 2; in + j;

      for (j = 1; j < = 2; j = j + 1)

         {

          m = m + 1;

          n = n * j;

          printf ("%d \t %d \t", m, n);

         }

   e) What is call by value ?

    f) Explain strlen ( ) function ?

   g) What is unary operator ?

   h) What is expression ?

    i) What is programming language ?

    j) What is compiler ?

   k) What is composition ?

    l) Declare following sparse matrix using dictionary

      0 0 0 1 0

      0 0 0 0 0

      0 0 0 3 0

P.T.O.

2. Attempt the following (**any four**) :   (**4×5=20**)
   a) Explain different data type used in C.
   b) Explain bitwise operator with suitable example.
   c) Explain syntax and use of Do-While Statement.
   d) Write any 5 steps of debugging.
   e) Explain rules to define function.

3. Attempt the following (**any four**) :   (**4×5=20**)
   a) Write a note on multi dimensional array.
   b) What is recursion ? Explain with suitable example.
   c) Explain the use of break, continue and goto statement.
   d) Explain any five dictionary methods with example in Python.
   e) Explain following list operations with example :
      I) Traversing
      II) Aliasing
      III) Cloning
      IV) + and ∗ operations.

4. Attempt the following (**any four**) :   (**4×5=20**)
   a) Write a C program to sort an array in ascending order.
   b) Write menu driven program to perform following operation :
      I) Addition
      II) Multiplication
      III) Subtraction.
   c) Write a C program to print all number between 1 to n divisible by 7.
   d) Write Python program to print Fibonacci series using recursion.
   e) Write a program to count newline characters in given file.

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| Seat |
| No. |

S.Y. B.Sc. (Animation) (Semester – II) Examination, 2014
AN – 2204 : MULTIMEDIA COMMUNICATION
(2011 Course)

Time : 2 Hours   Max. Marks : 40

Instructions : 1) **Neat** diagrams must be drawn **whenever** necessary.
                   2) Figures to the **right** side indicate **full** marks.

1. Answer the following :   **(1×10=10)**

     a) Name the elements of multimedia.

     b) Define Hypertext and Hypermedia.

     c) What is sound forge ?

     d) Name the two compression techniques.

     e) Write the abbreviations of
        i) GIF
       ii) JPEG.

     f) Define Lip reading.

     g) List the name of layers used in ICP/IP reference model.

     h) What is multiplexing ?

     i) What is cross talk ?

     j) Write the formula for attenuation and amplification.

2. Answer **any two** of the following :   **(2×5=10)**

     a) Write a note on music sequencing and notation.

     b) Write a note on 8-bit gray level image.

     c) Explain with diagram about electronic mail.

     d) Describe briefly about different types of transmission media.

3. Answer **any two** of the following :   **(2×5=10)**

     a) Write a note on network requirement of multimedia communication.

     b) Explain the following :
        i) Lip reading
       ii) Lip synchronization
      iii) Lit tracing.

     c) Briefly describe GIF file format.

     d) Explain all video editing tool.

4. Answer **any two** of the following : **(2×5=10)**

   a) Write a note on rendering tool used in animation.

   b) Explain any one standard relating to interactive application over internet.

   c) What are the type of media interaction ? Explain them.

   d) Explain following idle error control schemes with help of diagram :
      i) Error free
      ii) Corrupted A CK – Frame
      iii) Corrupted I – Frame.

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Seat
No.

T.Y. B.Sc. (Animation) (Semester – III) Examination, 2014
AN – 3103 : GAMING TECHNOLOGY
(2011 Course)

Time : 2 Hours   Max. Marks : 40

Instructions : 1) **All** questions are **compulsory**.
2) Figures to the **right** indicates **full** marks.
3) **Neat** diagrams/illustration must be drawn whenever **necessary**.

1. Attempt the following.   **(10×1=10)**

   a) Give names of the 5 web based games.

   b) Give names of 5 racing games.

   c) Name any 1 game console from 8th generation.

   d) What is the size of Fevicon icon and where it appears ?

   e) Give names of any 5 famous gaming companies.

   f) What should be the colorscheme for an action oriented game ?

   g) Give names of any 5 dice games.

   h) Draw a rough character concept of a thief holding a key.

   i) Give names of famous gaming consoles.

   j) Which company has created 'Candy Crush Suga' game ?

2. Answer **any 2** (out of 4).   **(5×2=10)**

   a) Describe how is the gaming big part of modern entertainment.

   b) Create a game character for 2D or 3D action games with props.

   c) Differentiate between 2D game art and 3D game art with example.

   d) Give 10 names of the famous gaming companies.

3. Answer **any 2** (out of 4).   **(5×2=10)**

   a) Create an idea for 2D casual game for mobile users.

   b) Create a character sketch of a cowboy for 2D game.

   c) Draw a concept sketch for any board game and explain the game play.

   d) Draw a concept sketch for endless runner game.

4. Answer **any 2** (out of 4).   **(5×2=10)**

   a) Give 5 names of the famous game engines and brief information.

   b) Create 5 different weapons for futurastic soldier and mention their use ingame.

   c) Create a game concept with ingame purchases and explain.

   d) Explain Roger Caillois definition of game.

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Seat
No.

T.Y. B.Sc. (Animation) (Semester – III) Examination, 2014
AN – 3104 : DIGITAL EDITING AND MOTION GRAPHICS
(2011 Course)

Time : 2 Hours   Max. Marks : 40

***Instructions** : 1) **All** questions are **compulsory**.*
*2) Figures to the **right** indicate **full** marks.*
*3) **Neat** diagram must be drawn **wherever** necessary.*

1. Answer the following questions :   **(1×10=10)**
   i) What is thaumatrope ?
   ii) What are promotional campaigns ?
   iii) What are tags ?
   iv) What are lineups and upfronts ?
   v) What are lower thirds ?
   vi) What are interstitials ?
   vii) What are show packages ?
   viii) What is the meaning of full HD ?
   ix) What is persistence of vision ?
   x) What is Silhouette animation?

2. Answer **any two** of the following :   **(2×5=10)**
   i) Describe in detail about the first non linear editor.
   ii) What is a Director's cut ?
   iii) Explain footage in detail.
   iv) Describe the latest technologies that have helped motion graphics.

3. Answer **any two** of the following :   **(2×5=10)**
   i) Explain the importance of Motion Graphics in exhibit design.
   ii) Describe in detail the use of Motion Graphics in a retail environment.
   iii) Write a detailed note on the use of motion graphics in web.
   iv) What do you mean by the term network branding ? Explain in detail.

4. Answer **any two** of the following :   **(2×5=10)**
   i) "Motion Graphics in Music Videos'. Explain.
   ii) What is PSA ? Explain in detail.
   iii) What are motion graphics ?
   iv) Differentiate between NTSC and PAL.

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Seat
No.

S.Y. B.Sc. (Semester – I) (Animation) Examination, 2014
AN – 2102 : 3D ANIMATION – I
(2011 Course)

Time : 2 Hours   Max. Marks : 40

Instructions : i) **All** questions are **compulsory**.
ii) **Neat** diagrams must be drawn **wherever** necessary.

1. Answer the following questions.   **(10×1=10)**
    1) What are the commands are hold in Application Button ?
    2) Write the full form of NURBS.
    3) What is the shortcut of opening files in the 3ds Max ?
    4) Write the description of Pin Stack.
    5) Function name of the Keyboard shortcut "CTRL+Z^n".
    6) In which filename extension 3ds Max file saved ?
    7) How many types of cameras are available in 3ds max ?
    8) Define specular.
    9) What is high key lighting ?
    10) Name any five formats file supported in 3ds Max for import.

2. Answer the following questions **(any 2)** :   **(2×5=10)**
    1) Explain Polygon Modeling.
    2) Explain the process of removing and disabling modifier.
    3) Explain the working with the view cube.
    4) Write the importance of importing and exporting.

3. Answer the following questions **(any 2)** :   **(2×5=10)**
    1) Write a short note of Mirror Modifier.
    2) Explain the linking process in 3ds Max.
    3) Write the difference between Twist and Taper Modifier.
    4) Explain spotlight and directional light parameters.

4. Answer the following questions **(any 2)** :   **(2×5=10)**
    1) How to create Multi-pass camera effects ?
    2) What is texture map ?
    3) Explain the importance of Natural and Artificial lighting in 3ds Max.
    4) Explain Ghosting.

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Seat
No.

S.Y. B.Sc.(Semester – I) (Animation) Examination, 2014
AN-2103 : DIGITAL ART – I
(2011 Course)

Time : 2 Hours   Max. Marks : 40

Instructions :   1) ***All*** questions are ***compulsory***.
        2) Figures to the ***right*** indicate ***full*** marks.
        3) Draw illustrations ***wherever*** required.

1. Answer the following questions.   **(10×1=10)**

    a) What is RGB stands for ?

    b) What is shortcut of 'undo' ?

    c) What is shortcut of 'Paint Bucket' tool ?

    d) What is shortcut of 'Pencil tool' ?

    e) What is 'Path selection' Tool use for ?

    f) What is 'Shape tool' use for ?

    g) What is 'Screen mode' use for ?

    h) What do you mean by 'Zoom IN' ?

    i) What does 'quick selection' tool use for ?

    j) What does 'Magnetic casso' tool use for ?

2. Answer the following questions (**any 2**).   **10**

    a) Explain following Blending modes :
        1) Dissolve :
        2) HUE :

    b) Explain Bitmap color mode.

    c) Explain Brush preset.

    d) Explain 'HDR Image'.

P.T.O.

3. Answer the following questions (**any 2**). **10**

    a) Explain 'Bevel and Emboss' Blending mode.

    b) Explain 'History Brush' .

    c) Explain 'Overlay and Hard mix' Blending mode.

    d) Explain quick mask mode.

4. Answer the following questions (**any 2**). **10**

    a) Explain 'CMYK' color mode use for.

    b) Explain 'clone stamp' and 'pattern stamp' tool.

    c) Explain 'Blur sharpen and Smudge tool'.

    d) Explain use of 'channels' .

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Seat No.	

S.Y. B.Sc. (Animation) (Semester – I) Examination, 2014
AN-2104 : MULTIMEDIA SYSTEMS
(2011 Course)

Time : 2 Hours Max. Marks : 40

Instructions : *1)* ***Neat*** *diagrams must be drawn* ***whenever*** *necessary.*
             2) Figures to the ***right*** *side indicate* ***full*** *marks.*

1. Answer the following : **(1×10=10)**
   a) What is RGB and CMYK ?
   b) Which are the two application that made computers easy to use for the first time ?
   c) Write the application of Multimedia.
   d) Name the two video compression standards that is defined by ITUI.
   e) List the MPEG standards.
   f) What are the elements of multimedia ?
   g) What is multimedia systems ?
   h) What is period and frequency ?
   i) State Nyquist sampling theorem.
   j) Write the abbreviation of MIDI and QMF.

2. Answer **any two** of the following : **(2×5=10)**
   a) Explain aspect ratio with diagrame.
   b) Write a note on time domain sampled representation of a signal.
   c) Write a note on sensors for TV cameras.
   d) Define briefly about Hyper application.

3. Answer **any two** of the following : **(2×5=10)**
   a) What are the factors that caused improved communication and growth in multimedia ?
   b) Explain RGB and CMYK color model with diagram.
   c) Write a note on track model and object model.
   d) What is DVI technology ?

4. Answer **any two** of the following : **(2×5=10)**
   a) Write a note on musical instrument synthesizers.
   b) What is MPEG and state and explain its types ?
   c) Define briefly the following terms :
      i) MIDI   ii) Psychoacoustics
   d) Explain Digital Representations of sound.

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Seat
No.

S.Y. B.Sc. (Animation) (Semester – I) Examination, 2014
AN-2105 : ANIMATION TECHNIQUE – I
(2011 Course)

Time : 2 Hours   Max. Marks : 40

Instructions :   1) **All** questions are **compulsory**.
  2) Figures to the **right** indicate **full** marks.
  3) **Neat** diagrams/Illustration must be drawn **wherever** necessary.

1. Answer the following questions : **(1×10=10)**

   a) What is an idea for a show ?

   b) What is a storyboard ?

   c) How stop motion was invented ?

   d) What are exposure sheets ?

   e) What is surface gauge ?

   f) What is replacement animation ?

   g) Why is straight ahead the only animation technique used in stop motion ?

   h) Explain any one animation principle.

   i) Which clay is used for clay puppets in Clay animation ?

   j) What is the use of tripod in stop motion ?

2. Answer the following question **(any 2)** : **(2×5=10)**

   a) What is the appeal of stop motion as a medium ?

   b) Explain in detail the evolution of stop motion animation.

   c) Describe in detail :

   I) Idea concept art and design.

   II) Story boarding.

   III) Sound recording and exposure sheets.

   IV) Designing building puppets and sets.

   V) Animation.

   d) Describe in detail various types of stop motion animation.

3. Answer the following questions **(any 2)** : **(2×5=10)**

   a) Describe the beginning of stop motion animation in detail.

   b) Define production pipeline and explain story boarding and its importance in production pipeline.

   c) Give an account of Starewitch's career in stop motion industry.

   d) Explain in brief Czechoslovakien stop motion industry.

4. Answer the following questions **(any 2)** : **(2×5=10)**

   a) Describe in detail the props and cons of stop motion animation.

   b) Define and explain Clay animation and cut-out animation.

   c) Write procedure of traditional cut-out animation.

   d) Give a brief account of Clay animation industry from the start to current.

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Seat
No.

S.Y. B.Sc. (Semester – II) Examination, 2014
ANIMATION
AN – 2202 : 3D Animation – II
(2011 Course)

Time : 2 Hours   Max. Marks : 40

Instructions : i) **All** questions are **compulsory**.
                        ii) **Neat** diagrams must be drawn **whenever** necessary.

1. Answer the following questions :   **(10×1=10)**
   1) What is the keyboard shortcut function "select and rotate" ?
   2) How do you open the "Dope sheet interface" in 3ds Max ?
   3) What is UVW mapping ?
   4) Which company developed the Metal Ray Engine ?
   5) What is Non Uniform Rational basic spline ?
   6) What are the option for editing in color map graph ?
   7) Define Dolly camera.
   8) What is CMYK ?
   9) What is (.3ds) ?
   10) What is PArray particle system ?

2. Answer the following questions **(any 2)** :   **(2×5=10)**
   1) Explain bones system.
   2) Explain the usage of containers tool bar.
   3) What is the importance of merging modifiers ?
   4) Explain motor space warp.

3. Answer the following questions **(any 2)** :   **(2×5=10)**
   1) What is the importance of Paint Deformation brush ?
   2) What is radiosity ?
   3) Explain final gathering.
   4) Explain the different IK (Inverse Kinematics) methods.

4. Answer the following questions **(any 2)** :   **(2×5=10)**
   1) Explain different type of particle system.
   2) What is the importance of track bar ?
   3) What is ray tracing ?
   4) Explain global illumination.

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Seat
No.

S.Y. B.Sc. (Animation) (Semester – II) Examination, 2014
AN-2203 : DIGITAL ART – II
(2011 Course)

Time : 2 Hours　　　　　　　　　　　　　　　　　　　　Max. Marks : 40

Instructions : 1) **All** questions are **compulsory**.
　　　　　　　 2) Figures to the **right** indicate **full** marks.
　　　　　　　 3) Draw illustrations **wherever** required.

1. Answer the following questions.　　　　　　　　　　　　　　　**(10×1=10)**

   a) What is 3d object tool use for ?

   b) What propose 'CMYK' color mode use for ?

   c) What is digital painting use for ?

   d) Write any four filters in Render.

   e) Write any two filters in sketch.

   f) What is shortcut of print ?

   g) What is 'Fq' stands for ?

   h) What is use of slice tool ?

   i) Name any two types of filters in stylive.

   j) What is full form of 'JPEG' ?

2. Answer the following questions **(any 2)** :　　　　　　　　　　　　**10**

   a) How to use image size and resolution ?

   b) Explain image process in 'script' option.

   c) Explain crop and straighten photos options.

   d) Explain save to web option in file menu.

3. Answer the following questions **(any 2)** :　　　　　　　　　　　　**10**

   a) Explain the process of changing 'Canvas size'.

   b) How to import video file in photoshop ? Explain.

   c) Explain Distort filters any two.

   d) Explain how to use filters.

4. Answer the following questions **(any 2)** : **10**

    a) Explain the use of following file format.

       - PSD

       - PDF

       - JPEG

       - PNG

    b) Explain colour swatches.

    c) Explain Artistic filters.

    d) Explain what is photo manipulation.

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Seat	
No.	

S.Y. B.Sc. (Animation) (Semester – II) Examination, 2014
AN – 2205 : ANIMATION TECHNIQUES – II
(2011 Course)

Time : 2 Hours   Max. Marks : 40

Instructions :   i) ***All*** questions are ***compulsory***.
                   ii) *Figures to the* ***right*** *indicate* ***full*** *marks.*
                   iii) ***Neat*** *diagrams illustrations must be drawn* ***wherever*** *necessary.*
                   iv) ***Each*** *illustration must be sketched on a blank* ***separate*** *page.*

1. Answer the following questions: **(10×1=10)**

    1) Define footage item.

    2) Name four video formats supported by After-Effects.

    3) Define Layers in After Effects.

    4) What is Ram preview ?

    5) How to convert a text-layer to a 3D layer with pre character 3D properties enabled ?

    6) What is Aperture ?

    7) What do blending Modes do ?

    8) How create a Camera Layer ?

    9) What is F – stop ?

   10) What does the screen blending mode do ?

2. Answer the following question (**any 2**):   **(2×5=10)**

    1) What is a dynamic link ?

    2) What are adjustment layers ?

    3) Explain color depth and high dynamic range color in detail.

    4) Explain the use of clone stamp tool.

3. Answer the following question (**any 2**):   **(2×5=10)**

    1) How to animate and edit paint strokes ?

    2) Explain keying and its various types in details.

    3) Describe the matte choker effect in details.

    4) Explain the common lighting controls in details.

4. Answer the following questions (**any 2**):   **(2×5=10)**

    1) Explain rotescoping in details.

    2) What is pre – composing ?

    3) What is Blue screening ?

    4) What is layer based compositing ?

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Seat
No.

S.Y. B.Sc. (Animation) (Semester – II) Examination, 2014
AN - 2206 : PRODUCTION PROCESS – II
(2011 Course)

Time : 2 Hours   Max. Marks : 40

Instructions : 1) **All** questions are **compulsory**.
2) Figures to the **right** indicates **full** marks.
3) Draw illustrations **wherever** required.

1. Answer the following questions :   **(10×1=10)**
   a) Write any two different types of camera movement.
   b) What is the 'vertigo Effect' ?
   c) What is Dubbing ?
   d) What is scene ?
   e) What is loop pan ?
   f) What is shots ?
   g) What is thumb nail ?
   h) Why 'timing' is important in Animation ?
   i) What is cips-sync ?
   j) What is FPS ?

2. Answer the following questions **(any 2)** :   **10**
   a) What is 'Animatic' ? Explain in brief.
   b) Explain the importance of staging.
   c) Explain the following with example :
      Close - up shot.
      Medium shot.
   d) Write a concept of pan shot.

3. Answer the following questions **(any 2)** :   **10**
   a) Explain in brief with example : Exposure sheet.
   b) Write a short note on 'compositing frame'.
   c) Write a short note on different types of camera angle.
   d) What is language of storyboard ? Explain.

4. Answer the following questions **(any 2)** :   **10**
   a) What is a language of script ? Explain.
   b) Explain the process of layout become B.G.
   c) What is ' focal point ' ? Why are they important ?
   d) Explain the importance of 'storyboard' in Animation movies.

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Seat
No.

F.Y. B.Sc. (Animation) Examination, 2014
Paper – III : BASICS OF ANIMATION
(2011 Course)

Time : 3 Hours   Max. Marks : 80

Instructions : 1) **All** questions are **compulsory**.
            2) Figures to the **right** indicate **full** marks.
            3) **Neat** diagrams/illustrations must be drawn **wherever** necessary.

1. Answer the following (**any 10**) :   **20**

    1) What is 'zeotrope' ?

    2) What is 'Flip-Book' ?

    3) What is 'Roto scope' ?

    4) What is other term of 'cel-Animation' ?

    5) Explain 'phenakistiscope'.

    6) Explain solid drawing.

    7) Explain 'contact pose'.

    8) What do you mean by 'Animation' ?

    9) What do you mean by 'Persistance of Vision' ?

    10) What is 3d Animation means ?

    11) What is 'Rapid sketches' ?

    12) Explain 'Slow-in and slow-out'.

2. Answer the following (**any 4**) :   **20**

    1) What is limited animation ? Explain.

    2) Explain the evolution in the field of animation from cave painting to the current industry.

    3) Why 2D Animation is base of 3D animation ?

    4) Explain the important of animation principles.

    5) Difference between stretch and squash.

3. Answer the following (**any 4**) :   **20**

    1) Explain follow through and overlapping action.

    2) What are the different types of animation ?

    3) What are basic antomy difference between the male and female figure ?

    4) Explain body language.

    5) What is key animation and In-Betweens ?

4. Answer the following (**any 4**) :   **20**

    1) What are the fundamental of design ? Explain.

    2) Explain foreground, mid-ground with the help of diagram.

    3) What is 'Magic-lantern' ? Explain.

    4) Explain following animation principle : 'Appeal'.

    5) Explain following animation principle : 'Exaggeration'.

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Seat
No.

T.Y. B.Sc. Animation (Semester – III) Examination, 2014
AN – 3102 : INTRODUCTION TO ACTION SCRIPT
(2011 Course)

Time : 2 Hours   Max. Marks : 40

Instructions** :* *1)* ***All *questions are* ***compulsory****.*
 2) Figures to the ***right*** *indicate* ***full*** *marks.*
 3) ***Neat*** *diagrams/illustration must be drawn* ***whenever*** *necessary.*

1. Answer **any ten** of the following :   **(1×10=10)**

    a) What is the difference between FLA, FLV and SWF files ?

    b) Why do we use break statement ?

    c) Write the two instance variables those are used by Mouse Event object to indicate Mouse Pointer's current position.

    d) Give any two examples of complex data type.

    e) What is the default text field type in Actionscript ?

    f) Explain the term "Event Object".

    g) State any two relational operators.

    h) Explain the term "Associative array".

    i) What is alpha property ?

    j) Write any three methods of inserting elements to an array.

2. Answer **any two** of the following :   **(5×2=10)**

    a) Explain the term "array elements" and write any three methods of removing elements from an array.

    b) Write a note on "Package".

    c) Explain the following terms. Associative array, Indexed array, Multidimensional array, Key.

    d) Explain for.. in loop with example.

P.T.O.

3. Answer **any two** of the following : **(5×2=10)**

   a) Write a function to navigate to a URL-www. adobe.com after clicking on a button.

   b) Explain following terms :

   Blending mode, Display object, Stage, Transformation, Display object container.

   c) Write a switch statement that will print the day of the week, based on the day number returned by the get day ( ) method.

   d) Write any 5 characteristics of object oriented programming language.

4. Answer **any two** of the following : **(5×2=10)**

   a) What is preloader ?

   b) Write a statement to create a text field and set its text as "welcome". Also explain the types of text field in AS3.

   c) Write a short note on Loader Info.

   d) Explain the Scale Mode Property of stage class. (How to control stage scalling ?)

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Seat No.	

T.Y. B.Sc. (Animation) (Semester – III) Examination, 2014
AN – 3105 : COLOR THEORY AND VISUAL DESIGN
(2011 Course)

Time : 2 Hours   Max. Marks : 40

Instructions : 1) ***All*** questions are ***compulsory***.
                   2) *Figures to the **right** indicate **full** marks.*
                   3) ***Neat*** *diagrams must be drawn **whenever** necessary.*

1. Answer the following question.   **(1×10=10)**
   a) What is Pigments ?
   b) What is the effect of colored objects in the eye ?
   c) What are experience when we keep eyes open in a totally dark place ?
   d) Define illuminated surface.
   e) What is the maximum time for after vision ?
   f) Define Shadow.
   g) Define grey.
   h) Write two condition for the existence of coloured shadows.
   i) What are physical colours ?
   j) What are accessory images ?

2. Answer the following questions **(any 2)** :   **10**
   a) What are the types of glass ? Explain.
   b) What are catoptrical colors ?
   c) Explain epoptical colors.
   d) What is visual design ?

3. Answer the following question **(any 2)** :   **10**
   a) What is similarity and contrast ?
   b) Explain the important of color theory.
   c) Explain the relation of combinations to light and dark.
   d) What is dominance principle of design ?

4. Answer the following question **(any 2)** :   **10**
   a) What are the different tendency to different colors ?
   b) What is characteristic coloring ? Explain.
   c) Explain in brief 'Inversion'.
   d) What is 'color balance' ?

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Seat
No.

T.Y. B.Sc. (Animation) (Semester – III) Examination, 2014
AN – 3106 : ADVANCE 3D ANIMATION – I
(2011 Course)

Time : 2 Hours
Max. Marks : 40

Instructions : 1) **All** questions are **compulsory**.
2) **Neat** diagrams must be drawn **wherever** necessary.
3) Figures to the **right** indicate **full** marks.

I. Answer the following questions : **(10×1=10)**
1) What is the difference between "Shift + D" and "Ctrl + D" ?
2) Name the type of primitives are in Maya.
3) Name the default views in Maya.
4) Write the Keyboard shortcut for set a key.
5) What are the components of a Polygon ?
6) What is a Polygon Face ?
7) What is a Polygon vertices ?
8) What is the full form of UI ?
9) What is a Polygon Edge ?
10) What is Planer Mapping ?

II. Answer the following questions **(any 2)** : **(2×5=10)**
1) Explain how to create blend shapes.
2) Explain UV Texture Mapping.
3) Explain "Create Polygon Tool".
4) Explain the use of "Resolution Gate".

III. Answer the following questions **(any 2)** : **(2×5=10)**
1) How do you create a playblast for your Animation ? Explain.
2) Explain how do you scene file management.
3) What are the difference between Planar Mapping and Cylindrical Mapping ?
4) Explain Stretch and Squash.

IV. Answer the following questions **(any 2)** : **(2×5=10)**
1) Write the difference between Automatic Mapping and Spherical Mapping.
2) What is MEL ?
3) Write the difference between Polygon and NURBS.
4) Explain Lattice ?

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Seat
No.

F.Y. B.Sc. (Animation) Examination, 2014
Paper – IV : FOUNDATION ART
(2011 Course)

Time : 3 Hours   Max. Marks : 80

Instructions : 1) **All** questions are **compulsory**.
2) Figures to the **right** indicates **full** marks.

1. Answer the following **any 10** :   **(2×10 = 20)**

    I) How gesture drawing can be improved ?

   II) Write difference in jaw lines in male and female.

  III) What is mannequin ?

   IV) Draw and label foreshortened glass.

    V) What is the another term for gray scale ? Why is it so ?

   VI) What are the kinds of light ? Give examples.

  VII) What is rhythm ?

 VIII) Write 3 fundamental forms of volume construction.

   IX) What is centre of gravity in balance ?

    X) Write any 4 facial expressions.

   XI) Define vanishing line.

  XII) What is perspective ?

2. Answer the following **any 4** :   **(5×4 = 20)**

    I) What are average proportions in male and female ?

   II) Draw and label human figure basic divisions.

  III) Explain hinge joints.

   IV) What are the types of perspective ? Explain them in detail.

    V) Write the method to draw solid 3D figures.

3. Answer the following **any 4** :   **(5×4 = 20)**

    I) How to draw male abdomen muscles ?

   II) What is gray scale ? Write a note on tones of gray scale.

  III) Which is the most neglected area of figure drawing ? and why so ?

P.T.O.

IV) On which factor drapery depends ?

V) What is the purpose of gesture drawing ? Which points are to be considered ?

4. Answer the following **any 4** :   **(5×4 = 20)**

   I) Explain dark tone and middle tone in shading with example.

   II) What is three-point perspective ?

   III) What is the importance of block construction in human skeleton ?

   IV) Explain difference between shape and forms.

   V) Explain vanishing point in details.

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Seat No.	

F.Y. B.Sc. (Animation) Examination, 2014
Paper – V : COMPUTER BASED 2D ANIMATION
(2011 Course)

Time : 3 Hours   Max. Marks : 80

Instructions :   1) *All* questions are *compulsory*.

                  2) *Figures to the **right** indicates **full** marks.*

                  3) ***Neat** diagrams/Illustrations must be drawn **wherever** necessary.*

1. Answer the following (**any ten**) :   **20**

    1) What is frame ?

    2) How to show a layer as a outline ?

    3) What is snap ?

    4) What is zoom ?

    5) What is gradient ?

    6) What is short cut of 'Move Tool' ?

    7) What is short cut of 'Ink Bottle' Tool ?

    8) What is short cut of 'Paint Bucket' ?

    9) What is 'FPS' ?

   10) What is shortcut of Insert frame ?

   11) What is shortcut of Remove frame ?

   12) What is shortcut of 'Line' Tool ?

2. Answer the following **(any 4)** :   **20**

    1) Explain 'Timeline Effects'.

    2) Explain 'Motion Tween'.

    3) Explain 'Play a head'.

    4) Explain 'layer'.

    5) Explain 'Time line'.

3. Answer the following **(any 4)** :   **20**

   1) What is characteristic of a line ? Explain.

   2) Explain 'Motion Guide'.

   3) Explain 'Break a part'.

   4) Explain 'Instance'.

   5) Explain in brief 'Symbol' ?

4. Answer the following **(any 4)** :   **20**

   1) What is 'Onion skin' ? Explain in brief.

   2) Explain in brief 'Library' ?

   3) What is Vector Graphics' ? Explain in brief.

   4) What is masking ? Explain in brief.

   5) Which file format support sound in flash ? Explain.

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Seat
No.

F.Y. B.Sc. (Animation) Examination, 2014
Paper – 7 : INTRODUCTION TO 3D ANIMATION AND MODELING – I
(2011 Course)

Time : 3 Hours   Max. Marks : 80

Instructions : *i)* **All** questions are **compulsory**.
ii) Figures to the **right** indicate **full** marks.
iii) **Neat** diagrams/illustrations must be drawn **wherever** necessary.

I. Answer the following questions **(any 10)** :   **(10×2=20)**

   1) What is tool bar ?

   2) What is Lower Interface Bar ?

   3) Define Quardmenus.

   4) What is Redo ? Write the keyboard shortcut.

   5) What are the options in Quick Access tool bar, write any four names ?

   6) What are the button/option in layer tool bar ?

   7) What is the keyboard shortcut of Move ?

   8) Write the setting snap points of CV.

   9) What are the options in Mirror dialog box ?

   10) What are the 2D shape primitives in 3ds Max ?

   11) Write the keyboard shortcut of "select none".

   12) What is Ungroup ?

II. Answer the following short notes **(any 4)** :   **(4×5=20)**

   1) Track Bar.
   2) Layer Manager.
   3) Aligning objects.
   4) Key controls.
   5) Snaps Tool bar.

III. Answer the following question **(any 4)** :   **(4×5=20)**

   1) Explain spacing tool.
   2) Explain the relationship between parent and child in 3ds Max.
   3) What is Meshes ?
   4) What is NURBS ?
   5) Define Particle system.

P.T.O.

IV. Answer the following questions **(any 4)** : **(4×5=20)**

    1) Explain Normals.

    2) What is the use of Distance tool ?

    3) Explain Disabling and Removing modifiers.

    4) Explain Delete spline modifier.

    5) Explain Lathing splines.

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F.Y. B.Sc. (Animation) Examination, 2014
Paper – VIII : INTRODUCTION TO MASS COMMUNICATION
Media Literacy and Culture
(2011 Course)

Time : 3 Hours   Max. Marks : 80

Instructions : *1)* ***All*** *questions are* ***compulsory****.*

2) Figures to the ***right*** *indicate* ***full*** *marks.*

1. Answer **any 10** out of 12 :   (10×2=20)

   i) What is Media Literacy ?

   ii) Define Virtual Life.

   iii) What are the types of sound used on Radio ?

   iv) What are the genre of Indian movies ?

   v) Define Historical documentary.

   vi) Define Media as place of ideas.

   vii) List any two video games.

   viii) What are Webzines ? Name two Webzines.

   ix) What is the importance of mass communication for a company ?

   x) What is the full form of PRO ?

   xi) Is the internet also misused ? How ?

   xii) What are e-books and d-books ?

2. Answer **any four** :   (4×5=20)

   i) What is the role of Public Relation Officer ?

   ii) Explain graphic layout.

   iii) What is the role of television in our everyday lives ?

   iv) What are e-books ? Are e-books the future ? Comment.

   v) What are the advantages of Web based communication ?

P.T.O.

3. Answer **any four** :   **(4×5=20)**

   i) What is the pattern of evolution of mass communication and when did it start ?

   ii) Explain the differences between Mass Communication and Personal Communication ?

   iii) What are the different promotion strategies used in Mass Communication.

   iv) Write a note on global media.

   v) What does democracy refers to with respect to Mass Communication and how does it relate to consolidation of mass media ?

4. Answer **any four** :   **(4×5=20)**

   i) Give a brief on Shannon Weaver model.

   ii) What are the current characteristics of news ?

   iii) What are the issues of media ethics ?

   iv) What are hard news and soft news ?

   v) Write a short note on the radio channels in India.

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Seat No.	

T.Y. B.Sc. (Semester – IV) Examination, 2014
COMPUTER SCIENCE (Paper – II)
CS – 342 : Theoretical Computer Science and Compiler Construction – II
(2008 Pattern)

Time : 2 Hours Max. Marks : 40

Instructions : *1) Neat diagrams must be drawn **wherever** necessary.*
*2) Black Figures to the **right** indicate **full** marks.*
*3) **All** questions carry **equal** marks.*
*4) **All** questions are **compulsory.***

1. Attempt **all** of the following : **(10×1 = 10)**

 a) Lex is a scanner provided by Linux Operating System. State True/ False.

 b) What does second 'L' stand for in LL(1) Parser ?

 c) Why basic block is transformed into DAG ? Give reason.

 d) S – attributed uses which type of parser.

 e) Give any two examples of Translator.

 f) Draw the neat labled transition diagram for recognising relational operators { <, <=}.

 g) Construct LR(1) items for the following production S $\rightarrow$ a.

 h) Define Translation Scheme.

 i) Define Augmented Grammar.

 j) What are the types of conflict occur in LR Parser ?

2. Attempt **any two** of the following : **(2×5 = 10)**

 a) Test whether the given grammar is LL(1) or not and construct a predictive parsing table for it.

 S $\rightarrow$ BD | AB

 A $\rightarrow$ aAa | b

 B $\rightarrow$ bAa | $\in$ (epsilon)

 D $\rightarrow$ $\in$ (epsilon)

 b) Consider the following SDD and find the dependency graph for the expression.
 real x, y, z

Production	Semantic Rules
D $\rightarrow$ TL	L.in = T. type
T $\rightarrow$ int	T. type = integer
T $\rightarrow$ real	T. type = real
L $\rightarrow$ L$_1$, id	L$_1$. in = L.in
	add type (id. entry, L.in)
L $\rightarrow$ id	add type (id. entry, L.in)

 c) What is the output of Lex program? Explain Lex Library functions.

P.T.O.

3. Attempt **any two** of the following. **(2× 5 = 10)**

   a) Check whether the following grammar is SLR(1) or not.
      S → xAy | xBy | xAz
      A → qS | q
      B → q

   b) Construct DAG for the following expression
      i) 2 ∗ (3 + 4) + (3 + 4) ∗ 2
      ii) b + (b + a) / (b – c) ∗ (a – c)

   c) Consider the following grammar

      S → A ∗ B | ∗ A

      A → # B | B #

      B → ∗ A | #

      Parse the string # ∗ # # ∗ # using shift - reduce Parser.

4. Attempt **any one** (Either **A** or **B**) of the following.

   a) Check whether the following grammar is LR(1) or not.   **6**
      S → Aa | bAc
      A → d

   b) Consider the following grammar.   **4**

      S → L = R | R

      L → ∗ R | id

      R → L
      Construct :
       i) Leading
       ii) Trailing
      iii) Operator precedence relation table.

                         OR

   a) Check whether the following grammar is LALR or not.   **6**

      E → AA

      A → aA|d

   b) Write a short note on Dominator tree.   **4**

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Seat No.

F.Y. B.Sc. (Computer Science) Examination, 2014
STATISTICS (Paper – I)
Statistical Methods – I
(2008 Pattern)

Time : 3 Hours   Max. Marks : 80

Note : i) ***All*** questions are ***compulsory***.
ii) *Figures to the **right** indicate **full** marks.*
iii) ***Use*** *of single memory, non-programmable, scientific calculators and statistical tables is **allowed***.
iv) *Symbols have their usual meanings unless otherwise stated.*

1. Attempt **all** of the following :   **(8×2=16)**

   a) Define **each** of the following.

      Class mark, Open end class

   b) Calculate mean from the following data of the heights in inches of a group of students.

      64, 64, 61, 62, 63, 61, 63.

   c) For a data set $\beta_1 = +1$, $\beta_2 = +4$, and variance = 9, find the value of μ_3.

   d) What type of correlation do you expect in the following situations ?
      i) The consumption of electricity and amount of electricity bill.
      ii) The price and demand of a commodity.

   e) Interpret **each** of the following :
      i) Coefficient of regression of Y on X is 4.
      ii) Coefficient of regression of X on Y is 0.6.

   f) What is trivariate data ? Illustrate with an example.

   g) Explain seasonal variation in a time series.

   h) For certain process the USL is 20 and LSL = 8. The observed process average is 16 and standard deviation (S) = 2. Calculate the value of $\hat{c}_p$.

2. Attempt **any four** of the following :   **(4×4=16)**

   a) Explain the following terms :
      i) Exclusive method of classification.
      ii) Inclusive method of classification.

   b) Describe the construction of an Ogive curve and state its uses.

c) Represent the following data using histogram :

Marks :	0-20	20-40	40-60	60-80	80-100
No. of Students :	5	10	30	20	10

d) The following table gives the number of students in different age groups. If the median of the distribution is 11 year, find the missing frequencies where total frequency is 300.

Age group (yrs.) :	0-5	5-10	10-15	15-20	20-25	25-30
No. of Students :	15	125	–	66	–	4

e) A group of 60 observations has mean 10 and variance 4. A subgroup of 40 observations of it has mean 11 and variance 2.25. Find the mean and standard deviation of the other subgroup.

f) Calculate coefficient of variation for the following data :

17, 18, 20, 17, 19, 21, 20.

3. Attempt **any four** of the following :   **(4×4=16)**

a) What is Skewness ? Explain Bowley's coefficient of Skewness.

b) The first three raw moments of a distribution are 2, 20 and 40 respectively. Compare first three central moments. Obtain appropriate measure of Skewness and comment on the result.

c) What is Kurtosis ? State a measure of Kurtosis based on moments. Also arrange following distributions in ascending order of variance.

Mesokurtic distribution, Leptokurtic distribution, Platykurtic distribution.

d) The mean, standard deviation and Pearson's coefficient of Skewness of a frequency distribution are 58, 20 and – 0.32. Find mode and median.

e) What is a Scatter diagram ? How does it help in studying the correlation between two variables in respect of both direction and degree ?

f) The students obtained the following marks in statistics (X) and Accountancy (Y).

X :	92	89	86	87	83	71	77	63	53	50
Y :	86	83	77	91	68	52	85	82	57	57

Find the rank correlation coefficient.

4. Attempt **any four** of the following :   **(4×4=16)**

a) In a regression study the two regression lines are : $2x – 3y + 6 = 0$ and $4y – 5x – 8 = 0$. Calculate correlation coefficient between x and y. Also, determine the standard deviation of y, if the standard deviation of x is 3.

b) State the formula and interpret the values of regression coefficient b_{yx} and b_{xy}. Also state any two properties of regression coefficients.

c) Describe the procedure of fitting an exponential curve of the type $y = ab^x$ for a bivariate data where a and b are constants.

d) The simple correlation coefficients between soil temperature (X_1), corn yield (X_2) and rainfall (X_3) are :

$r_{12} = 0.59$, $r_{13} = 0.46$ and $r_{23} = 0.77$. Compute the values of $r_{12.3}$ and $R_{1.23}$

e) Explain briefly the additive and multiplicative models of time series analysis.

f) In an inspection of a car part the average values of 16 sub-groups were found to be $\overline{\overline{X}} = 0.8768$, $\overline{R} = 0.0027$ inch, Given $A_2 = 0.58$, $D_3 = 0$ and $D_4 = 2.11$. Compute UCL and LCL for $\overline{X}$ and R–chart.

5. Attempt **any four** of the following :   **(4×4=16)**

a) In a trivariate distribution :

$r_{12} = 0.8$, $r_{13} = 0.6$, $r_{23} = 0.5$

$\sigma_1 = 10$ $\sigma_2 = 8$ $\sigma_3 = 5$

Determine the regression equation of X_2 on X_1 and X_3, if the variates are measured from their respective means.

b) Explain the concept of multiple correlation for a trivariate data. State its measure.

c) Compute the 3-yearly moving averages from the following data :

Years :	1991	1992	1993	1994	1995	1996	1997	1998
Annual Sales (Rs. in Crores) :	36	43	43	34	44	54	34	24

d) Explain in brief the causes of variation in the quality of manufactured product.

e) Describe the stepwise procedure of obtaining the line of regression of X on Y using the method of least squares.

f) Compute correlation coefficient and interpret its value for the following data :

X : 2   3   4   5   6

Y : 10   13 16   19 22

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Seat	
No.	

F.Y. B.Sc. (Computer Science) Examination, 2014
COMPUTER SCIENCE (Paper – I)
CS – 101 : Problem Solving using Computer and 'C' Programming
(2013 Pattern)

Time : 3 Hours   Total Marks : 80

> ***Note :*** *i)* ***All*** *questions are* ***compulsory****.*
>   *ii) Figures to the* ***right*** *indicate* ***full*** *marks.*
>   *iii)* ***Neat*** *diagrams must be drawn* ***wherever*** *necessary.*

1. Answer the following :   **(1×10=10)**
   - a) Define flowchart.
   - b) Which language uses mnemonics for instructions ?
   - c) What is a variable ?
   - d) Explain the function isspace(c).
   - e) What are library functions in 'C' ?
   - f) Give the syntax of array declaration.
   - g) "All command line arguments are stored as strings". State whether true or false.
   - h) What is a void pointer ?
   - i) "A structure declaration does not use any memory". State whether true or false.
   - j) What is the purpose of "# include" in a C program ?

2. Answer the following **any four**.   **(5×4=20)**
   - 1) What is the structure of a C program ?
   - 2) List and explain any five escape sequences.
   - 3) Explain union with example.
   - 4) Differentiate between auto and static storage class.
   - 5) Write short note on preprocessor.

3. Answer the following **any four**.   **(5×4=20)**
   - 1) What is an algorithm ? State its properties.
   - 2) What is the output of following program ? Justify.
     ```
     # include <stdio.h>
     main()
     {  chat s[ ] = "Prime" ;
        char * ptr ;
        ptr = s+ strlen(s)
        while (– – ptr > = s)
           puts (ptr)
     }
     ```

3) What will be the output of following ? Justify.

```
# include <stdio.h>
int main( )
{   int X = 12, Y = 7, Z;
    Z = X ! = 4 || Y = = 2 ;
    printf("Z = %d \ n", z);
    return 0;
}
```

4) Write a recursive function to calculate n! (n factorial).

5) What is the output of this code ? Justify

```
# include (stdio.h>
int main( )
{ int a[5] = {5, 1, 15, 20, 25};
  int i, j, m;
  i = + + a[1]
  j = a[1]++;
  m = a[i++]
 printf("%d, %d, %d", i, j, m);
}.
```

4. Answer the following **any four**.   **(5×4=20)**

   1) Write a 'C' program to accept an array of n numbers and display the multiples of 5.

   2) Write a 'C' program to accept two strings as command line argument and concatenate the second to the first.

   3) Write a 'C' program to print the transpose of a matrix.

   4) Write a C program to accept a number and check whether it is prime or note.

   5) Write a program to accept students information (Roll no. name, percentage of marks) for n students and display it in descending order of percentage.

5. Answer the following **any 2**.   **(5×2=10)**

   1) Differentiate between static memory allocation and dynamic memory allocation.

   2) Explain the various modes which are used in fopen( ) function with suitable examples.

   3) Explain the methods of passing arguments to functions with example.

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Seat	
No.	

F.Y. B.Sc. (Computer Science) Examination, 2014
STATISTICS (Paper – I)
ST – 101 : Statistical Methods – I
(2013 Pattern)

Time : 3 Hours   Max. Marks : 80

Note :   i) ***All*** questions are ***compulsory***.
　　　　ii) *Figures to the **right** indicate **full** marks.*
　　　　iii) ***Use*** *of single memory, non-programmable, scientific calculators and statistical tables is **allowed**.*
　　　　iv) *Symbols have their usual meanings unless otherwise stated.*

1. a) Fill in the blanks :   **(4 marks)**
    i) The standard deviation of data set {7, 7, 7, 7, 7} is _____
    ii) For symmetric distribution, the third order central moment is equal to _____
    iii) A Bernoulli random variable assumes only _____ values.
    iv) Time series data are arranged in _____ order.

   b) Select the correct option for **each** of the following :   **(4 marks)**
    i) The arithmetic mean of first n natural numbers is

      A) $\dfrac{n}{2}$ 　　　　 B) $\dfrac{n+1}{2}$ 　　　　 C) $\dfrac{n-1}{2}$ 　　　　 D) $\dfrac{(n+1)\,(2n+1)}{6}$

    ii) If E(X) = 5 and Var(X) = 5, then E(X + 6) and Var(X + 6) are equal to
      A) 11, 11　　　 B) 5, 5　　　　 C) 11, 5　　　　 D) 5, 11

    iii) If $X \to B(n, p)$ and E(X) = $\dfrac{5}{3}$, Var(X) = $\dfrac{10}{9}$, then the value of q is

      A) $\dfrac{2}{3}$ 　　　　 B) $\dfrac{1}{3}$ 　　　　 C) $\dfrac{1}{6}$ 　　　　 D) $\dfrac{5}{6}$

    iv) In a trivariate study, the correlation coefficient between any two variables when the effect of third variable is eliminated is called as
      A) Simple correlation　　　　　　 B) Partial correlation
      C) Multiple correlation　　　　　　 D) Multiple regression

   c) Attempt **each** of the following :   **(8 marks)**
    i) Define the terms :
      1) Attribute
      2) Discrete Variable
    ii) Given : mean = 100, median = 106. Find mode by using empirical relation.
    iii) State probability mass function of binomial distribution. Give one real life situation where it is applicable.
    iv) If $6x^2 = 6y^2 = 3$, COV(X, Y) = 2, find correlation coefficient between variables X and Y.

2. Attempt **any four** of the following. **(4×4=16)**

   a) Explain the concept of dispersion.

   b) The following data pertain to two workers doing the same job in a factory.

	Worker A	Worker B
Mean time of completing the job (minutes)	40	42
Standard deviations (in minutes)	12	6

   Who is more consistent worker ? Why ?

   c) Explain the procedure of obtaining Box-plot. State its uses.

   d) Prepare stem and leaf chart from the heights in centimeter of 20 students given below :

   171, 145, 153, 162, 172, 159, 168, 148, 158, 151, 154, 152, 163, 165, 161, 156, 164, 146, 147, 161.

   e) Define Mode. Explain the procedure of computing mode for grouped frequency distribution.

   f) Arithmetic mean and standard deviation of 12 items are 22 and 3 respectively. Later on it was observed that the item 32 was wrongly taken as 23. Compute correct mean and correct standard deviation.

3. Attempt **any four** of the following. **(4×4=16)**

   a) Define central moments for a discrete frequency distribution. Express third central moments in terms of raw moments.

   b) The arithmetic mean, standard deviation and Karl Pearson's coefficient of skewness of a frequency distribution are 29.5, 6.5 and 0.32 respectively. Find the Mode and Median.

   c) Define Skewness. Indicate different types of skewness, with the help of Box-Plot. Also, mention which measure of skewness is appropriate for frequency distribution with open-end class.

   d) Define :
   1) Discrete random variable.
   2) Probability mass function of a discrete random variable.

   e) A discrete r.v. X has the following probability distribution :

X	0	1	2	3	4	5	6	7	8
P[X = x]	c	3c	5c	7c	9c	11c	13c	15c	17c

   Find :
   1) The value of c
   2) Distribution function of r.v. X.

   f) Let X be a Poisson random variable with mean 2. Calculate
   1) $P(X = 0)$
   2) $P(1 < X \leq 4)$

4. Attempt **any two** of the following.

   a) i) What is scatter diagram ? How does it help in deciding nature and degree of correlation between two variables ? **4**

   ii) The incidence of occupational disease in chemical industry is such that the workers have a 20% chance of suffering from it. What is the probability that out of seven workers chosen at random, atleast two will suffer from the disease ? **4**

   b) i) Define regression coefficients b_{YX} and b_{XY}. State any two properties of regression coefficients. **4**

   ii) In a regression study, the two regression lines are :

   $2X - 3Y + 6 = 0$ and $4Y - 5X - 8 = 0$

   Find :

   1) Means of X and Y

   2) Correlation coefficient between X and Y. **4**

   c) i) Define Geometric distribution. State its mean and variance. Give one real life situation where it is applicable. **4**

   ii) A certain population has logistic growth with equation approximately **4**

   $$Y = \frac{80}{1 + e^{180 - 0.09X}}$$

   Y = population in lakhs; X = Year.

   1) Estimate the population in the year 2014.

   2) Find the year when the population was half of the carrying capacity.

   d) i) Explain the concept of multiple regression with an illustration. **4**

   ii) For a trivariate data : **4**

   $\sigma_1 = 2.4, \sigma_2 = 2.7, \sigma_3 = 2.7$

   $\gamma_{12} = 0.28, \gamma_{13} = 0.49, \gamma_{23} = 0.51$

   Find the least square equation of plane of regression of X_1 on X_2 and X_3, if the variables are measured from their respective means.

5. Attempt **any one** of the following.

   a) i) Define : **8**
      1) Bivariate data
      2) Coefficient of determination
      3) Multiple correlation coefficient
      4) Coefficient of correlation between X and Y.

   ii) Fit a trend line to the following time series by the least squares method. **8**

Year	:	2001	2002	2003	2004	2005
Production (in lakh tonnes):		12	20	28	32	50

b)   i) Describe the procedure of fitting an exponential curve $Y = ab^X$ by using the method of least squares for a bivariate data.   **8**

  ii) Estimate the trend by using 4-yearly moving average method for the following data.   **8**

Year	Rainfall at Pune (in mm)
1996	648
1997	603
1998	578
1999	657
2000	444
2001	519
2002	576
2003	551

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Seat
No.

S.Y. B.Sc. (Computer Science) (Semester – I) Examination, 2014
CS – 212 : RELATIONAL DATABASE MANAGEMENT SYSTEM (Paper – II)
(2013 Pattern)

Time : 2 Hours   Max. Marks : 40

Instructions : 1) **All** questions carry **equal** marks.
                        2) **All** questions are **compulsory**.
                        3) Figures to the **right** indicate **full** marks.

1. Attempt **all** of the following :   **(1×10=10)**

    a) What is Referential Integrity ?

    b) State the three components of middleware software.

    c) State Thomas Write Rule.

    d) Give any two advantages of three-tier architecture.

    e) Define time stamp.

    f) Write the output of the following

       SELECT CONCAT_WS (',', 'abc', 'xyz', 'lmn');

    g) Define term checkpoint.

    h) What is a trigger ?

    i) State any two Armstrong's Axioms.

    j) What is meant by system log ?

2. Attempt **any two** of the following :   **(2×5=10)**

    a) Explain the services provided by a server component.

    b) State and explain in detail the difference between Discretionary Access Control and Mandatory Access Control.

    c) State and explain types of functional dependencies.

P.T.O.

3. Attempt **any two** of the following : **(2×5=10)**

a) The following is the list of events in interleaved execution of set of transactions T_1, T_2, T_3, T_4 with two phase locking protocol.

Time	Transaction	Code
t_1	T_1	Lock (a, S)
t_2	T_2	Lock (a, S)
t_3	T_3	Lock (b, X)
t_4	T_4	Lock (c, X)
t_5	T_1	Lock (c, X)
t_6	T_3	Lock (d, X)
t_7	T_4	Lock (a, X)

Construct a wait for graph according to above request. Is there deadlock at any instance ? Justify.

b) Consider the following transactions :

T_1	T_2
Read (A);	
A = A + 70;	
	Read (B)
	Read (C)
	B = B – 10;
Write (A);	Write (B);
	Write (C);
Read (C);	
C = C + 40;	
	Read (D);
	D = D + 5;
Write (C);	
	Read (A);
	Write (C);
	A = A – 15;
	Write (A);
Read (D);	

Give at least two non serial schedules that are serializable.

c) What are the desirable properties of decomposition ?

4. Attempt the following : **(2×5=10)**

   a) Consider the following log entries at the time of system crash.

   [start – transaction, T_1]

   [write_ item, T_1, A, 30]

   [commit, T_1]

   [checkpoint]

   [start_ transaction, T_2]

   [start_ transaction, T_3]

   [write_ item, T_2, C, 35]

   [write_ item, T_3, B, 15]

   [commit, T_2]

   [start – transaction T_4]

   [write_ item T_4, D, 20] ← system crash.

   If deferred update with checkpoint is used, what will be recovery procedure ?

   b) Explain phantom phenomenon that occurs in dynamic database.

                  OR

   b) Write a note on Multiple Granularity.

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Seat
No.

S.Y. B.Sc. (Computer Science) (Semester – I) Examination, 2014
ELECTRONICS (Paper – II)
ELC – 212 : Analog Systems
(2013 Pattern)

Time : 2 Hours   Max. Marks : 40

Instructions : 1) **All** questions are **compulsory**.
2) Figures to **right** indicate **full** marks.
3) **Neat** diagrams must be drawn **wherever** necessary.

1. Answer the following questions in **one** or **two** sentences.   **(10×1=10)**

   a) List any two temperature sensors.

   b) What is the use of Wheat Stone's bridge ?

   c) How many comparators are required for a 10 bit Flash ADC ?

   d) Name any two elements of float device.

   e) Define passive transducer.

   f) Define cut off frequency with respect to filter.

   g) State any two applications of DAC.

   h) What will be the output of LM35 at 45°C ?

   i) Draw frequency response of ideal high pass filter.

   j) State two advantages of R-2R ladder network over binary weighted network.

2. Attempt **any two** of the following.   **(2×5=10)**

   a) Draw neat block diagram of analog electronic system and explain function of each block.

   b) Draw circuit diagram of instrumentation amplifier using three op-amp and derive expression for its gain.

   c) Explain the working of temperature monitoring system using LM35.

3. Attempt **any two** of the following.   **(2×5=10)**

   a) Differentiate between active and passive filters.

   b) Draw diagram of 4 bit binary weighted resistor network. Write expression for its output voltage. For a 4 bit binary weighted resistor network (0 = 0V, 1 = 16V). Find full scale output voltage.

   c) Explain basic principle of capacitive touch sensor with appropriate diagrams. Give any two applications of it.

4. Attempt **any one** of the following.   **(1×10=10)**

    a) i) Explain first order low pass active filter with neat circuit diagram and frequency response.

        ii) Explain ECG system with appropriate block diagram.

                OR

    b) i) Explain operating principle of LDR. What are the materials used for making of LDR ?

        ii) Explain working of Dual Slope ADC with neat diagram.

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Seat
No.

S.Y. B.Sc. (Computer Science) (Semester – I) Examination, 2014
MATHEMATICS (Paper – I)
MTC – 211 : Linear Algebra
(2008 Pattern)

Time : 2 Hours   Max. Marks : 40

Note : 1) ***All*** questions are ***compulsory***.
           2) *Figures to the* ***right*** *indicate* ***full*** *marks.*

1. Attempt **each** of the following.   **10**

   i) Determine for which values of k the vectors $\bar{u} = (2, 2, 3)$ and $\bar{v} = (2, 7, k)$ are orthogonal.

   ii) What is condition on system of linear equations AX = B has unique solution ?

   iii) Consider the subset $W = \{(X, Y) / X + Y = 4\}$ of $\mathbb{R}^2$. Is W a subspace of $\mathbb{R}^2$.

   iv) Consider the linear transformation $T : \mathbb{R}^3 \to \mathbb{R}^3$ given by T(X, Y, Z) = (X + Y ; X + 2Y + Z). Find the standard matrix of T.

   v) If linear transformation $T : \mathbb{P}_1 \to \mathbb{R}^2$ defined by T(at + b) = (a – 3b, b + 1) then determine it T is a linear transformation.

   vi) Consider the linear transformation $T : \mathbb{R}^3 \to \mathbb{R}^3$ defined by T(X, Y, Z) = (0, a + 2b, b + c). Determine if the vector $\bar{u} = (-2, 1, -1)$ is in Ker(T).

   vii) If A is 5 × 100 order matrix and rank(A) = 5 then what is nullity of A ?

   viii) For which real values of λ do the following vectors form linearly dependent set in $\mathbb{R}^3$

   $$\left\{\left(-\frac{1}{2}, \lambda, -\frac{1}{2}\right), \left(\lambda, -\frac{1}{2}, -\frac{1}{2}\right), \left(-\frac{1}{2}, -\frac{1}{2}, \lambda\right)\right\}.$$

   ix) If matrix $A = \begin{bmatrix} 1 & \frac{1}{2} & 0 & 1 \\ 0 & \frac{1}{3} & 0 & 0 \\ 0 & 0 & \frac{1}{3} & 1 \\ 0 & 0 & 0 & 1 \end{bmatrix}$, then find determinant of A.

   x) If matrix A has eigen values 0, – 1, 2 then find eigen values of matrix A^3.

2. Attempt **any two** of the following.   **10**

   i) Let S be a set with two or more vectors in a vector space V. Then prove that S is linearly dependent if and only if at least one of the vectors in S is expressible as a linear combination of the rest of the vectors in S.

   ii) Determine if the set of vectors $\{(2, 1, 1), (-1, 0, 1), (0, 1, 0)\}$ forms a basis for $\mathbb{R}^3$.

   iii) Solve the following system of linear equations by Gauss-Jordan elimination method.
   $x_1 + 4x_2 + 5x_3 + 6x_4 + 9x_5 = 0$; $3x_1 - 2x_2 + x_3 + 4x_4 - x_5 = 0$; $-x_1 - x_3 - 2x_4 = x_5 = 0$; $2x_1 + 3x_2 + 5x_3 + 7x_4 + 8x_5 = 0$.

3. Attempt **any two** of the following :   **10**

   i) If $T : V \rightarrow W$ is a Linear transformation then prove that range(T) is a subspace of W.

   ii) If $T : \mathbb{R}^3 \rightarrow \mathbb{R}^3$ is a linear transformation given by $T(X, Y, Z) = (X - 2Y + 3Z, 2X - 5Y + 7Z, 3X - 6Y + 9Z)$ then find dimension of Kernel of T.

   iii) Use Gram-Schmidt process to transform the basis $\{(1, -3), (2, 2)\}$ to orthonormal basis for $\mathbb{R}^2$.

4. Attempt **any one** of the following.   **10**

   i) a) Find all eigenvalues of the matrix A = $\begin{bmatrix} 2 & 1 & 1 \\ 2 & 3 & 4 \\ -1 & -1 & -2 \end{bmatrix}$ also find eigenspace of A corresponding to the largest eigenvalue of A.

   b) Find the basis for the subspace spanned by the vectors
   $\overline{v}_1 = (1, -2, 0, 0, 3), \overline{v}_2 = (2, -5, -3, -2, 6), \overline{v}_3 = (0, 5, 15, 10, 0)$.

   ii) a) If an n×n matrix A is diagonalizable, then prove that A has n linearly independent eigen vectors.

   b) Let A be a 2×3 matrix and T : $R^3 \rightarrow R^2$ be a matrix transformation T(X) = AX given by

   $T\left(\begin{bmatrix} 1 \\ 0 \\ 0 \end{bmatrix}\right) = \begin{bmatrix} 1 \\ 1 \end{bmatrix}$, $T\left(\begin{bmatrix} 0 \\ 1 \\ 0 \end{bmatrix}\right) = \begin{bmatrix} 3 \\ 0 \end{bmatrix}$, $T\left(\begin{bmatrix} 0 \\ 0 \\ 1 \end{bmatrix}\right) = \begin{bmatrix} 4 \\ -7 \end{bmatrix}$ find $T\left(\begin{bmatrix} a \\ b \\ c \end{bmatrix}\right)$, hence find matrix A.

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S.Y. B.Sc. (Computer Science) (Semester – I) Examination, 2014
ELECTRONICS (Paper – II)
ELC 212 : Process Control Instrumentation
(2004 Pattern)

Time : 2 Hours   Max. Marks : 40

Instructions : 1) *All* questions are *compulsory*.
                         2) *Figure to the right indicates full marks.*
                         3) *Draw neat diagram whenever necessary.*

1. Write answers of following questions in **one** or **two** sentences :   **(10×1=10)**
   a) Define process lag.
   b) Write equation for output of a derivative controller.
   c) Sampling frequency is 1 KHz with duty cycle 50% calculate hold time.
   d) If the step angle of stepper motor is 30°, how many stable states will it have ?
   e) Give two examples of physical systems which are represented by 1st order differential equation.
   f) State working principle of RTD.
   g) Give any two materials used for photoconductive sensors.
   h) State sampling theorem.
   i) What is transient analysis in PSPICE ?
   j) Name the actuator used in the printer head of a dot matrix printer.

2. Attempt **any two** of the following :   **(2×5=10)**
   a) Explain close loop control system with neat block diagram.
   b) Draw flow chart for multichannel analog multiplexed DAS.
   c) Explain the integral control mode and give its advantages and disadvantages.

3. Attempt **any two** of the following :   **(2×5=10)**
   a) Explain construction and working of LVDT as a displacement sensor.
   b) Find out transfer function of series RC circuit.
   c) The proportional controller output is nominally 60% with constant of K_p = 10% per %. A load change occurs when flow though value changes from 60% to 70%. Calculate offset error.

4. Attempt **any one** of the following :   **(1×10=10)**
   a) Describe any two signal conditioning techniques in detail.   **5**
   b) Draw circuit diagram of instrumentation amplifier using three op-amp. Give it output equation.   **5**

                                    OR

   a) Draw and explain working of a sample and hold circuit with input and output waveforms.   **5**
   b) Distinguish between analog multiplexer and digital multiplexer.   **5**

                          _____

Seat
No.

S.Y. B.Sc. (Computer Science) (Semester – II) Examination, 2014
MATHEMATICS (Paper – II)
MTC-222 : Operations Research
(2008 Pattern)

Time : 2 Hours　　　　　　　　　　　　　　　　　　　　　　　　Max. Marks : 40

Note : 1) ***All*** questions are ***compulsory***.
　　　　　2) Figures to the ***right*** indicate ***full*** marks.
　　　　　3) Use of single memory, non-programmable scientific calculator is ***allowed***.
　　　　　4) Graph papers will be supplied on ***demand***.

1. Attempt **each** of the following :　　　　　　　　　　　　　　　　　　**10**
   i) Draw the feasible region using following constraints
      $x \leq 5$
      $y \geq 3$
      $x, y \geq 0$
   ii) Write the following LPP in standard form.
      Minimize $Z = 4x_1 - x_2 + 3x_3$
      Subject to,　　$2x_1 + 4x_3 \geq 5$
      　　　　　　　$x_1 + 3x_3 \geq 4$
      　　　　　　　$x_1 - x_2 + x_3 \leq 7$
      　　　　　　　$x_1, x_2, x_3 \geq 0$
   iii) Define, slack variable.
   iv) Write the dual of the following LPP.
      Minimize $Z = 2x_1 + 10x_2 + 12x_3$
      Subject to,　　$x_1 + 5x_2 + 3x_3 \geq 5$
      　　　　　　　$x_1 + x_2 + 4x_3 \geq 4$
      　　　　　　　$x_1, x_2, x_3 \geq 0$
   v) Comment on the solution of the linear programming problem, for which the last table of simplex method is given below. (R denotes artificial variable)

C_B	C_i / X_B	X_1	X_2	S_1	S_2	– M / R	Const
2	X_2	2	1	1	0	0	2
– M	R	– 5	0	– 4	–1	1	4
$Z_j - C_j$		5M + 1	0	4M + 2	M	0	

vi) Find an initial basic feasible solution to the following transportation problem by North-West corner method.

	D₁	**D₂**	**D₃**	**Supply**
O₁	5	3	7	30
O₂	2	6	9	30
Demand →	20	20	20	

vii) Following is an IBFS of a transportation problem. Is this solution optimal ? Justify.

5	3 ⑤	2 ⑩
1 ㉕	5	4 ⑮

viii) Solve the following assignment problem.

	A	**B**	**C**
I	5	2	1
II	4	3	3
III	3	5	4

ix) Define 'Fair game'.

x) Is the following game stable ?

Player B

$$\text{Player A} \begin{bmatrix} 1 & 3 & 2 \\ 0 & -4 & -3 \\ 1 & 5 & -1 \end{bmatrix}$$

2. Attempt **any two** of the following :   **10**

   i) Solve the following Linear Programming Problem by Graphical Method.

   Maximize Z = 3x + 5y

   Subject to,

   $$x + y \leq 15$$
   $$x + 2y \leq 20$$
   $$y \leq 6$$
   $$x, y \geq 0$$

   ii) Solve the following Assignment problem.

	I	II	III	IV	V
A	21	27	18	26	30
B	19	17	22	16	25
C	23	26	25	22	26
D	31	34	27	38	36
E	24	20	22	21	25

   iii) Solve the following game by Dominance Principle.

   Player B

		I	II	III	IV	V
	I	1	3	2	7	4
Player A	**II**	3	4	1	5	6
	III	6	5	7	6	5
	IV	2	0	6	3	1

3. Attempt **any two** of the following :   **10**

   i) Find an initial basic feasible solution of the following transportation problem by Least Cost Method.

To → From ↓	W_1	W_2	W_3	W_4	Supply
F_1	30	25	40	20	100
F_2	29	26	35	40	250
F_3	31	33	37	30	150
Demand	90	160	200	50	500

ii) Solve the following LPP by Simplex Method.

Maximize $Z = 40x_1 + 35x_2$

Subject to, $2x_1 + 3x_2 \leq 60$

$4x_1 + 3x_2 \leq 96$

$x_1, x_2 \geq 0$

iii) Solve the following game by Graphical Method.

Player B

$$\text{Player A} \quad \begin{array}{c} \mathbf{I} \\ \mathbf{II} \\ \mathbf{III} \end{array} \begin{bmatrix} 2 & 7 \\ 3 & 5 \\ 11 & 2 \end{bmatrix} \begin{array}{c} \mathbf{I} \quad \mathbf{II} \end{array}$$

4. Attempt **any one** of the following : **10**

i) Solve the following Linear Programming Problem by Simplex Method.

Maximize $Z = 4x_1 + 5x_2 - 3x_3$

Subject to the constraints,

$x_1 + x_2 + x_3 = 10$

$x_1 - x_2 \geq 1$

$2x_1 + 3x_2 + x_3 \leq 30$

$x_1, x_2, x_3 \geq 0$

ii) Find the initial basic feasible solution of the following T.P. by Vogel's approximation method and obtain the optimal solution by using MODI Method.

Destination → ↓ Origin	D_1	D_2	D_3	D_4	Supply ↓
O_1	9	5	8	5	225
O_2	9	10	13	7	75
O_3	14	5	3	7	100
Demand →	225	80	95	100	400 / 500

—————

Seat
No.

F.Y. B.Sc. (Computer Science) Examination, 2014
MATHEMATICS (Paper – I)
Discrete Mathematics
(2008 Pattern)

Time : 3 Hours　　　　　　　　　　　　　　　　　　　　Max. Marks : 80

Note :　i) **All** questions are **compulsory**.
　　　　ii) Figures to the **right** indicate **full** marks.
　　　　iii) **Neat** diagrams must be drawn **wherever** necessary.

1. Attempt **all** of the following questions :　　　　　　　　　　　　**16**

　　i) Translate the following statement into symbolic form and hence write its negation.
　　　　"Some drivers do not obey the speed limit"

　　ii) How many three letter words are there that begin with a vowel, if repetition of letters is allowed ?

　　iii) Find first four terms of the sequence a_n defined by the following recurrence relation.
　　　　$a_n = 2 a_{n-1} + a_{n-2}$, $a_0 = 1$, $a_1 = 2$.

　　iv) State first principle of Mathematical Induction.

　　v) Define (a) Complete graph (b) Balanced digraph. Give one example of each.

　　vi) Draw all possible non-isomorphic simple graphs on 3 vertices.

　　vii) Fuse the vertices V_4 and V_3 in the following graph.
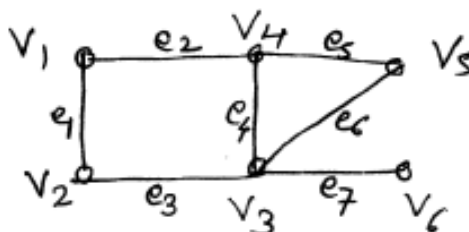
　　viii) Determine whether there exists a graph with the following degrees :
　　　　5, 4, 3, 2, 1

2. Attempt **any four** of the following :　　　　　　　　　　　　　　**16**

　　i) How many ten digit binary numbers are there that contain
　　　　a) exactly four 1's
　　　　b) atmost four 1's.

　　ii) Solve the recurrence relation :
　　　　$a_n = 7 a_{n-1} - 10 a_{n-2}$, $a_0 = 10$, $a_1 = 41$.

iii) Draw the arborescence and hence write the following expression in polish notation.

$(2x - y)^2 \times (5a + 3b)$

iv) Arrange the following functions according to their growth rate and justify your answer

2^n, n, n!, n^3, n log n

v) Using Mathematical Induction, prove that $(11^n - 6)$ is divisible by 5 for all $n \geq 1$.

vi) Check the validity of the following argument using indirect method.

$p \rightarrow q, r, r \rightarrow s, \sim s \vee \sim q \vdash \sim p$

3. Attempt **any four** of the following : **16**

i) Write the adjacency matrix and incidence matrix of the following graph.
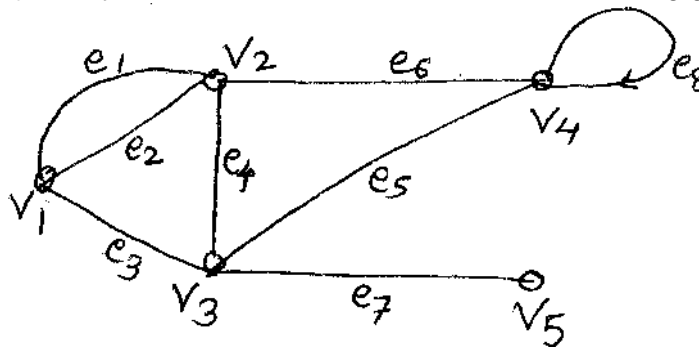
ii) Show that if any 14 integers are selected from the set S = {1, 2, ..., 25}, there are atleast two whose sum is 26.

iii) Find Union and Intersection of the following graphs.
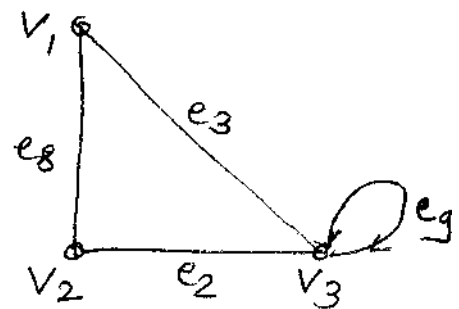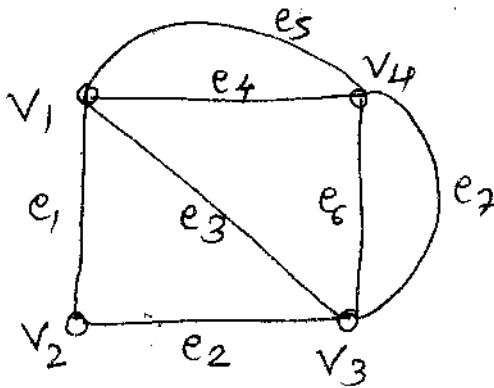
G_1

iv) Prove that if G is a self complementary graph on n vertices then n is of the type 4k or 4k + 1.

v) Find eccentricities of all vertices of the following tree and hence find its centres, radius and diameter of T.
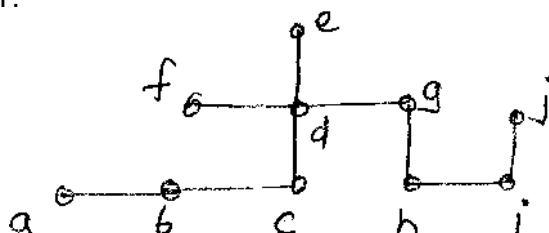
vi) Consider the following graph G and its spanning tree T.
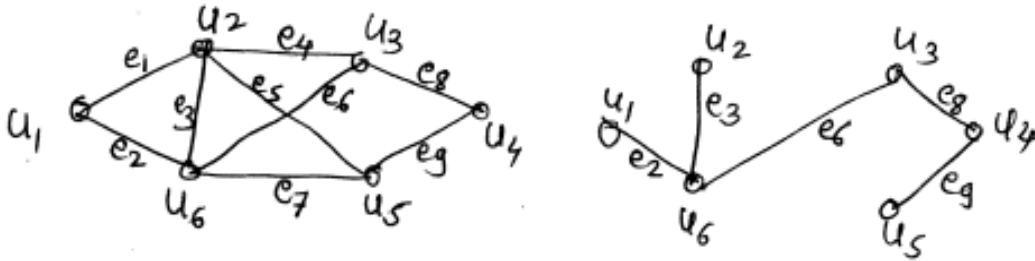
List all fundamental circuits in G with respect to T.

4. Attempt **any two** of the following : **16**

i) How many positive integers less than or equal to 700 are divisible by 5 or 7 or 11 ?

ii) Solve the following recurrence relation

$a_{n+2} + 2a_{n+1} + a_n = 9.2^n$, $a_0 = 2$, $a_1 = 4$

iii) a) Sort the following array using Bubble sort method.

12, 0, –9, 2, 10, 25

b) Let T be a binary tree on n vertices. Then show that T has $\dfrac{n+1}{2}$ pendant vertices.

iv) Test the validity of the following argument using direct method of proof. "If I study, then I will not fail in Mathematics. If I do not play cricket, then I will study. I failed in Mathematics. Hence I played cricket". (S, F, C)

5. Attempt **any two** of the following : **16**

i) Use Dijkstra's algorithm to obtain the shortest path from vertex a to vertex f in the following weighted graph.
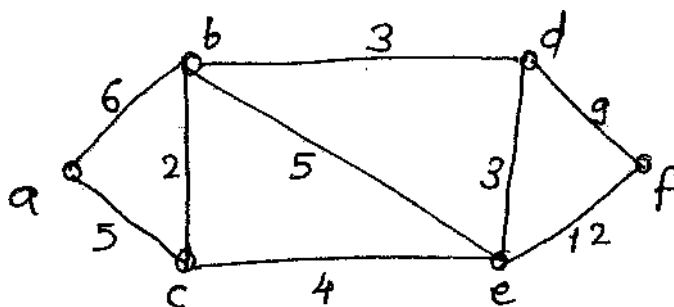
ii) Define :

a) Complete Bipartite graph.

b) Vertex connectivity.

c) Edge connectivity.

Draw the complete bipartite graph $K_{4, 3}$. Also find its vertex connectivity and edge connectivity.

iii) Use Kruskal's algorithm to obtain shortest spanning of the following graph.
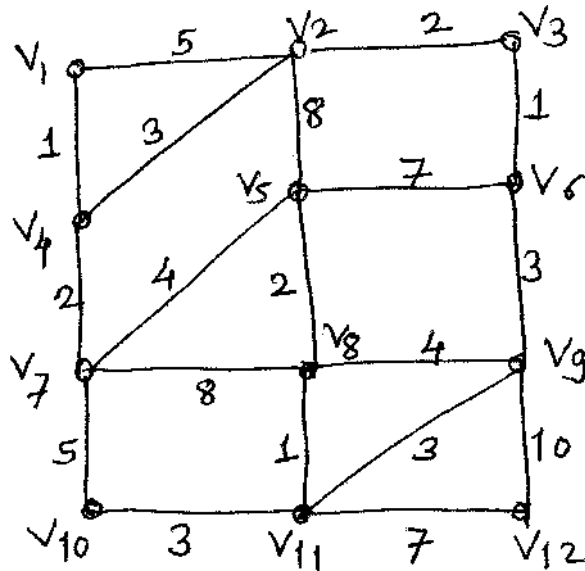
iv) Determine maximal flow in the given network by using Ford-Fulkerson algorithm. Find value of the maximal flow.

_____
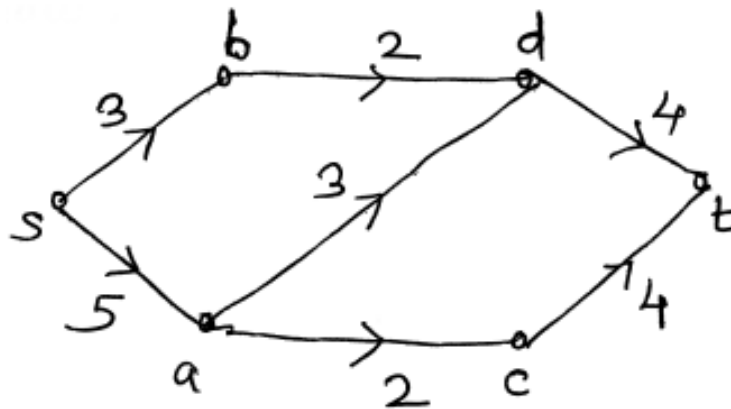
Seat
No.

T.Y. B.Sc. (Semester – III) Examination, 2014
COMPUTER SCIENCE (Paper – II)
CS – 332 : Theoretical Computer Science & Compiler Construction – I
(2008 Pattern)

Time : 2 Hours   Max. Marks : 40

Instructions : 1) ***Neat*** diagrams must be drawn ***wherever*** necessary.
2) ***Black*** figures to the right indicate ***full*** marks.
3) ***All*** questions carry ***equal*** marks.
4) ***All*** questions are ***compulsory***.

1. Attempt **all** of the following.   **(1×10=10)**

   a) Let A = {1, 2} and B = {2, 3} find (A × B).

   b) Define unit production with example.

   c) State two differences between NFA and DFA.

   d) Write regular expression for a language consists of strings having length divisible by 3 over {a}.

   e) Find CFG for the language, $L = \{a^n b^m c^n \mid m, n \geq 1\}$.

   f) Write formal definition of TM.

   g) Define left linear and right linear grammar.

   h) $R^* R^* = R^*$, state true or false. Justify.

   i) Define recursively enumerable language.

   j) State two differences between PDA and FA.

2. Attempt **any two** of the following.   **(5×2=10)**

   a) Construct FA for regular expression $(a + b)^* + ab^*$.

   b) Define Moore Machine. Design a Moore machine to change all vowels to '$', and rest of the 21 alphabets changes to '#'.

   c) Construct a DFA which accepts odd number of 1's and even number of 0's over {0, 1}.

3. Attempt **any two** of the following.   **(5×2=10)**

   a) Show that regular sets are closed under concatenation with an example.

   b) Construct NPDA for the language $L = \{a^n b^n \mid n \geq 1\} \cup \{a^m b^{2m} \mid m \geq 1\}$.

   c) Construct TM for the language $L = \{wcw^R \mid w \in (0 + 1)^*\}$.

4. A) Attempt **any one** (either **A** or **B**) of the following.

    a) Find minimum state FA equivalent to the following DFA, M = ({q_0, --, q_5}, {a, b}, δ, q_0, {q_4, q_5}).   **4**
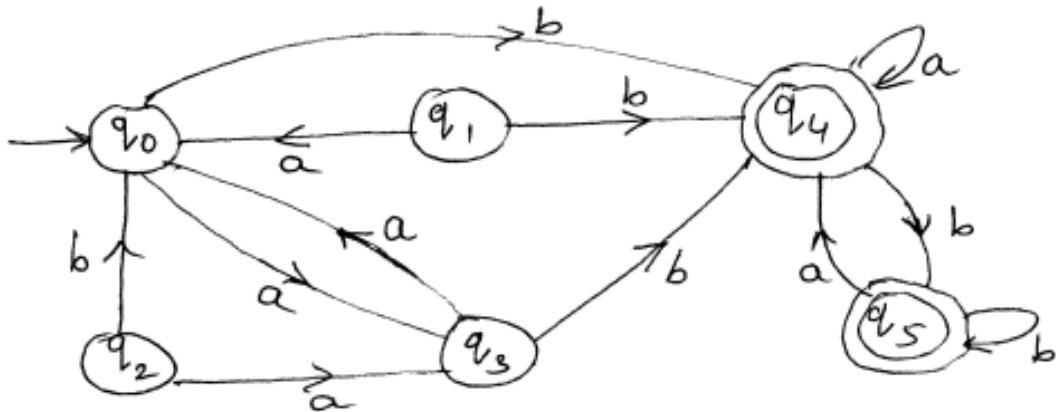
    b) Check whether the following grammar is ambiguous or not.   **4**

       S → aB | aA
       A → aAB | a | b
       B → Abb | b

    c) Define NFA with $\in$-closure.   **2**

           OR

  B) a) Convert the following CFG into CNF (Chomsky Normal Form).   **4**

       S → ABA
       A → aA | $\in$
       B → bB | $\in$

    b) Show that L = {$\omega\omega$ | $\omega \in (a + b)^*$} is not regular.   **4**

    c) If L_1 = {$a^m b^m$ | m $\geq$ 1} and
       L_2 = {b^m | m $\geq$ 0}
       Find $L_1 \cup L_2$ and $L_1 \cap L_2$.   **2**

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Seat
No.

T.Y. B.Sc. (Semester – III) Examination, 2014
COMPUTER SCIENCE (Paper – V)
CS – 335 : Programming in Java – I
(2008 Pattern)

Time : 2 Hours   Max. Marks : 40

Instructions : 1) *All* questions are *compulsory*.
                  2) *All* questions carry *equal* marks.
                  3) *Black figures to the right* indicate *full* marks.
                  4) *Neat* diagrams must be drawn *wherever* necessary.

1. Attempt all of the following :   **(10×1=10)**

   a) Java is compiled and interpreted language. Comment.

   b) Define blank final variable.

   c) Which package is automatically loaded by JVM ?

   d) Is it necessary to used all methods from an interface ? Justify.

   e) Name the class which should be extended to create user-defined exception.

   f) What are two basic stream types supported by Java ?

   g) Which stream is used to read primitive data from a file ?

   h) What is the default layout for Frame and Panel ?

   i) List the mandatory attributes of the APPLET tag.

   j) State the two uses of 'super' keyword.

2. Attempt **any two** of the following :   **(2×5=10)**

   a) Write a Java program which accepts e-mail address from the user and throws an exception "Invalid Address" if it does not contain '@' symbol.

   b) Derive a class square from class Rect. Create another class Circle. Create an interface with only one method called area. Implement this interface in all the classes. Include appropriate data members and constructors in all classes. Write a program to accept details of a square and circle and display the area.

   c) Explain the life cycle of an applet.

3. Attempt **any two** of the following :   **(2×5=10)**

   a) Explain AWT components in detail.

   b) Write a java program to accept 'n' strings from the user and display the length of the longest string.

   c) What is Byte Stream ? Explain any four byte stream.

4. Attempt **any one** of the following (either **A** or **B**) :

A) i) Write a Java program that handle the mouse events and display position of the mouse click in a text box. (Design screen using frame class). **4**

   ii) Differentiate between abstract class and final class. **4**

   iii) What is the output of the following ? **2**

   Class mainclass

   {

     Public static void main (string a[ ])

      {

       try

        {

         int x = $\frac{5}{0}$;

         System.out. println ("End of try") ;

        }

       finally

        {

         System.out println ("End of finally") ;

        }

      }

    }

   OR

B) i) What is method overloading ? Explain with an example. **4**

   ii) Explain different types of access specifiers used in package. **4**

   iii) What is the standard way to read a text file in Java ? **2**

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Seat
No.

F.Y. B.Sc. (Computer Science) Examination, 2014
MATHEMATICS (Paper – II)
Algebra and Calculus
(2008 Pattern)

Time : 3 Hours   Max. Marks : 80

Instructions : *1)* ***All*** *questions are* ***compulsory****.*
               2) Figures to the ***right*** *indicate* ***full*** *marks.*
               3) ***Neat*** *diagrams must be drawn* ***wherever*** *necessary.*

1. Attempt **each** of the following.   **16**

   a) Let A = {1, 2, 3} check wheather the following relation R and Set A is reflexive and transitive. Justify R = {(1, 1), (2, 2), (3, 3), (1, 2)}

   b) Let A = {x, y, z} write the relation R whose matrix of relation is given below $M[R] = \begin{bmatrix} 1 & 0 & 0 \\ 1 & 1 & 0 \\ 0 & 1 & 1 \end{bmatrix}$.

   c) Find the greatest common divisor of – 20 and – 25.

   d) State Lagrange's mean value theorem.

   e) State De′Morgan's law in (B – , $\vee$, $\wedge$).

   f) If y = log(2x – 5). Find yr.

   g) Show that the series $1 + 0.5 + (0.5)^2 + ...$ converges to 2.

   h) Test if the sequence $\{(-5)^n\}$ is bounded or not. Also find its bounds.

2. Attempt **any four** of the following.   **16**

   a) Show that $\sqrt{3}$ is not a rational number.

   b) Write the boolean expression $f(x) = (x \vee y) \wedge \bar{z}$ in disjunctive normal form.

   c) Prove that $a \equiv b(\bmod n)$ if a and b leave same remainder when divided by n, where $a, b \in \mathbb{Z}, n \in \mathbb{N}$.

   d) Prove that any tow equivalence classes are either identical or disjoint.

   e) Construct multiplication table for $(\mathbb{Z}_{12}^*, *)$.

   f) Prove that on set of integers if we define relation aRb $\Leftrightarrow$ 5 | 2a + 3b. Then R is an equivalence relation.

3. Attempt **any four** of the following.   **16**

   1) Show that the sequence $\{x_n\}$ where, $x_n = \dfrac{3n-4}{4n+7}$ is monotonically increasing bounded and convergent.

2) Discuss the convergence of the series $1 + \dfrac{\sqrt{2}}{3} + \dfrac{\sqrt{3}}{5} + \dfrac{\sqrt{4}}{7} + ...$

3) Test the continuity of the following function $f(x) = \begin{cases} \dfrac{x^2 - 9}{x - 3} & \text{if } 0 \le x < 3 \\ 4x - 6 & \text{if } 3 \le x < 6 \\ 2x + 9 & \text{if } x > 6 \end{cases}$

4) Verify Rolle's mean value theorem for the function $f(x) = x^2 (1 - x)^2$ on [0, 1].

5) Assuming the validity of expansion expand $e^x \sin x$ in ascending powers of $\left(x - \dfrac{\pi}{4} \right)$. Find atleast three nonzero terms.

6) Evaluate $\lim\limits_{x \to 0} \dfrac{a^x - 1}{b^x - 1}$ by L^1 Hospital's rule .

4. Attempt **any two** of the following. **16**

   a) Using Warshall's Algorithm obtain the transitive closure of relation R denoted by R^*. Also find diagraph of relation R^*. Where $R = \{(1, 2), (2, 2), (2, 4), (3, 2), (3, 4), (4, 1)\}$ R is a relation defined on $A = \{1, 2, 3, 4\}$.

   b) Discuss the convergence of series $\sum \dfrac{1}{n}p$ by considering cases $(p > 1, p < 1$ and $p = 1)$.

   c) State and prove Fermat's theorem and hence find the remainder when 17^{1402} is divided by 13.

   d) Show that 4999 and 1109 are relatively prime. Also find integers x and y such that $d = 4999x + 1109y$.

5. Attempt **any two** of the following. **16**

   1) State Leibnitz's theorem and hence prove that if $y = \sin(m \sin^{-1} x)$ then
   $(1 - x^2)y_{n+2} - (2n + 1)x\, y_{n+1} - (n^2 - m^2)y_n = 0$.

   2) State Maclaurin's theorem with Cauchy's form of remainder and hence show
   $$\log\left(\frac{1+x}{1-x} \right) = 2\left[x + \frac{x^3}{3} + \frac{x^5}{5} ... \right].$$

   3) State and prove Lagrange's Mean value theorem. Interprete Geometrically.

      a) Consider the sequence $\{x_n\}$ defined by $x_1 = \sqrt{2}$, $x_{n+1} = \sqrt{2.x_n}$ show that the sequence $\{x_n\}$ is convergent.

      b) Evaluate $\lim\limits_{x \to 0} (\sin x)^{\tan x}$ by L' Hospital's rule.

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Seat No.	

T.Y. B.Sc. (Computer Science) (Semester – IV) Examination, 2014
COMPUTER SCIENCE (Paper – VI)
CS – 346 : Business Applications
(2008 Pattern)

Time : 2 Hours   Max. Marks : 40

Instructions : 1) **Neat** diagrams must be drawn **wherever** necessary.
2) Figures to the **right** indicate **full** marks.
3) **All** questions are **compulsory**.

1. Attempt **all** of the following :   **(1×10=10)**

   a) Define Sales Budget.

   b) What are the limitations of ATM ?

   c) Give any two benefits of Employee Appraisal.

   d) Give any two types of off-the-job training.

   e) What is meant by KPO ?

   f) What are the requirements for opening a Saving Bank Account ?

   g) Define TQM.

   h) What are the components of BOM ?

   i) State the purpose of Leave Accounting.

   j) Give any two types of Market Segmentations.

2. Attempt **any two** of the following :   **(2×5=10)**

   a) Write in detail for objectives of Production Planning.

   b) Explain the MRP – II in detail.

   c) What are different E-banking product and services used in world ?

3. Attempt **any two** of the following :   **(2×5=10)**

   a) Explain different activities of CRM.

   b) What are the advantages of ERP ?

   c) Write in detail for recruitment techniques.

4. Attempt the following :

a) "My World Television Services" provides Direct-to-Home subscriptions to the customers accross the city. When customer demands a connection they Provide Digital Set-Top box and recharge smart card to the customer. When customer pays monthly installment amount to the office either by cash or online, to renew the connection.

During subscription period if any complaint arrived, it can be solved by appointing a service person to resolve the problem. As number of customers growing, company found many complaints are not solved within available time and sometimes there is a shortage of Set-TOP boxes and other equipments also. Company have a risk of losing customers and hence decided to have an automated system to handle this situation.

    i) Suggest main processes using any one diagram like DFD/HIPO chart/class diagram. **2**

    ii) Suggest atleast 3 input documents with proper formats and controls. **3**

    iii) Suggest atleast 2 column-wise report layouts in details. **2**

b) Explain in brief about Employee Training Techniques. **3**

<div align="center">OR</div>

b) Write in detail about Biometric devices. **3**

<div align="center">—————</div>

[4618] – 1

Seat
No.

F.Y. B.Sc. Examination, 2014
COMPUTER SCIENCE (Paper – I)
Introduction to Programming and 'C' Programming
(2008 Pattern)

Time : 3 Hours
Max. Marks : 80

Instructions : 1) **All** questions are **compulsory**.

2) Figures to the **right** indicates **full** marks.

3) **Neat** diagram must be drawn **wherever** necessary.

1. Answer the following : **(1×10=10)**

   a) Define Assembler.

   b) Write any two advantages of Algorithm.

   c) "–ABC" is a valid 'C' identifier. Comment.

   d) Explain the use of ispunct() function.

   e) Find memory requirement for int A [5][3];

   f) Write one difference between malloc () and calloc () ?

   g) Define string.

   h) Write valid 'C' statement for the following :

   $$\frac{5}{3}(2 + a \cdot b))$$

   i) Find value of ans if

   int ans = 5, x = 20;

   ans = ans + x ++;

   j) What is use of typedef keyword ?

2. Answer the following **(any 4)** : **(5×4=20)**

   a) Explain limitation of Arrays.

   b) Explain any five string handling functions with example.

   c) Explain working of do-while loop with example.

   d) Explain << and >> operators with example.

   e) Write a note on storage classes in 'C'.

3. Answer the following **(any 4)** : **(5×4=20)**

   a) Write Algorithm and draw flowchart to check whether a given number is prefect number or not. [e.g 6 = factors of 6 1, 2, 3 6 = 1+2+3 = 6].

   b) Find and justify output of following program.

```
    main ()
{
    int m = 100;
    while (m > 0)
    {
      if (m < 70)
        break;
    printf ("%d \n", m)
    m = m – 10;
    }
}
```

   c) Find and justify output of following program.

```
    main ()
    {
      void add (int * , int);
     int a = 10, b = 20;
     add (&a ; b);
     printf ("a = %d b = %d" , a, b);
    }
     void add (int * a, int b)
    {
     *a = *a + 1;
     b = b + 1;

    }
```

d) Find and justify output of following program

```
    main ()
{
   int x = 10, y = 10;
   int * p1 = & x, *p2 = &y;
   prinf ("%d \n", (*p1) ++);
   printf ("%d \n", – – (*p2));
   printf ("%d \n", *p1 + (* p2) – –);
}
```

e) Find and justify output of following program.

```
#define Num 4+4
#define DEN 16–4
main ()
{
   int ans;
   ans = Num/DEN;
   printf ("%d", Num);
   printf ("%d", DEN);
   prinf ("%d", ans);
}
```

4. Answer the following **(any 4)** :   **(5×4=20)**

   a) Write a program to check whether the given number is armstrong number or not.

   [e.g 153 = $1^3 + 5^3 + 3^3$ = 153].

   b) Write a program to concatenate two strings using pointers. (Don't use standard Library function).

   c) Write 'C' program to define a structure Hotel with members as Name, Address and Grade of Hotel. Accept details of 'n' different Hotels and Display the list of Hotels having 'A' Grade.

   d) Write a 'C' program to accept filename and a character through command Line Argument. Display the count of the number of times the character occurred in file.

   e) Write a program to accept 'n' elements into an Array. Store all even elements into another even array and odd elements into odd array. Display both the array.

5. Answer the following **(any 2)** : **(5×2=10)**

   a) Explain various file opening modes used with fopen() function.

   b) Differentiate between structure and union.

   c) Explain different parameters passing methods to function.

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F.Y. B.Sc. (Computer Science) Examination, 2014
COMPUTER SCIENCE (Paper – II)
CS-102 : File Organization and Fundamentals of Databases
(2013 Pattern)

Time : 3 Hours   Max. Marks : 80

*Instructions : 1) **Neat** diagrams must be drawn **wherever** necessary.*
*2) Figures to the **right** indicate **full** marks.*
*3) Assume suitable data if **necessary**.*

1. Attempt **all** of the following :   (10×1=10)
   a) Define an Entity.
   b) Give the different types of file organizations.
   c) What is a derived attribute ?
   d) State any two types of integrity constraints.
   e) What is DBMS ? Give any two advantages of DBMS.
   f) Which command is used to modify structure of a table ? Give its syntax.
   g) Define First Normal Form.
   h) What are the types of Data Independence ?
   i) What is Cartesian product operation ?
   j) What is the difference between char and varchar ?

2. Answer **any four** of the following :   (4×5=20)
   a) What is aggregation ? Explain with example how it is useful ?
   b) What are the desirable properties of decomposition ? Explain in brief.
   c) What is a data model ? Explain any two types of data models.
   d) Explain how strong and weak entity sets can be converted to tabular representation with examples.
   e) State and explain the different types of operations that can be performed on a database file.

3. Answer **any four** of the following :   (4×5=20)
   a) What are the different types of relationships that can exist in Entity sets in an ER-Model ?
   b) State and explain the anomalies that can arise if we have redundant data.
   c) Consider the relation R = (A, B, C, D, E, F) and the set of F.D's.
      F = {A→BC, CD→E, E→C, D→AEF, ABF→BD, DF→BC}
      Compute (BCD)$^+$.
   d) Explain single valued and multi valued attributes with example.
   e) Who is the DBA ? Give any four functions of DBA.

P.T.O.

4. A) Attempt **any three** of the following : **(3×5=15)**

   a) Consider the following relations :

   Supplier : (s_id, sname, address)

   Parts : (p_id, pname, colour)

   Supplier and parts are related with many to many relationship with the descriptive attribute cost.

   Create a relational database in 3NF and solve the following queries in SQL.

   i) Find the suppliers who supply parts with blue or orange colour.

   ii) Find the part name and cost of all parts supplied by the supplier "Sai Services".

   iii) Find the names of suppliers who supply maximum no. of parts.

   b) Consider the following relations.

   Musician : (m_no, mname, age, m_city)

   Instrument : (i_no; i_name)

   Musician and Instrument are related with many-to-many relationship. Create a relational database in 3NF and solve the following queries in SQL.

   i) List all the musicians having age between 20 and 50.

   ii) Find all the instruments played by 'Mr. Sen'.

   iii) List all the musicians who play atleast one instrument played by 'Mr. Husen'.

   c) Consider the following relations.

   Employee (e_no, name, salary, title)

   Project (p_no, pname, location)

   Employee and project are related with many to one relationship. Create a relational database in 3NF and solve the following queries in SQL.

   i) List all the employees working on the project 'maintenance'.

   ii) List all the projects having more than 10 employees.

   iii) Give the titles of all employees working on the 'CAD/CAM' project.

   d) Consider the following relations.

   Student (Roll_no, name, address, class)

   Subject (Sub_no, name)

   Student and subject are related with many to many relationship with the descriptive attribute 'marks'.

   Create a relational database in 3NF and solve the following queries in SQL.

   i) List subjectwise list of students.

   ii) Count the no. of students who have opted for 'databases' subject.

   iii) Give the name and marks of student scoring maximum marks in the subject 'Advanced OS'.

B) Attempt **any one** of the following : (1×5=5)

    a) Consider the following relations :

      Branch (b_no, bname, city, assets)

      Customer (c_no, cname, city, street)

      Account (a_no, b_no, balance)

      Depositor (c_no, a_no)

      Solve the following queries in Relational Algebra :
       i) Give the names of customers who stay in 'Pune'
       ii) Find the balance of customer 'Mr. Savarkar'.
       iii) Give the branch name and city of branches having assets greater than 2,00,000.
       iv) Find account no. of all accounts in 'Kothrud' branch.
       v) Find the names of all branches having customers living in 'Mumbai'.

    b) Consider the following relations :

      Food (f_id, name, description)

      Ingredient (i_id, name, type)

      fd_Ind (f_id, i_id, quantity)

      Solve the following queries in Relational Algebra :
       i) Give the names of ingredients along with the quantity used in the food 'Dry-fruit Cake'
       ii) List the ingredients which are used in both 'Chocolate cake' and 'Biscuits'.
       iii) Find the ingredients used in 'Bakarwadi'.
       iv) Find all ingredients of the type 'Veg'.
       v) How much quantity of 'sugar' is needed for "cup cakes" ?

5. A) A multiplex cinema theatre has several screens, each screen has a fixed no. of shows associated with it. Each show has a start time and a end time. A movie can be shown across more than one screens at the same time. Each screen has limited seating capacity and can show more than one movie, across different shows. Customers book their tickets for a movie, for a particular show. Each ticket has a seat no. associated with it.

    Based on the above information :
     i) Design an E-R diagram.
     ii) Convert the E-R diagram into Relational database in 3NF. **7**

B) Explain symbols which are used to draw Entity relationship diagram. **3**

          OR

B) Explain what is DML with example. **3**

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Seat No.

F.Y. B.Sc. (Computer Science) Examination, 2014
MATHEMATICS (Paper – I)
MTC - 101 : Discrete Mathematics
(2013 Pattern)

Time : 3 Hours   Total Marks : 80

Note :   i) **All** questions are **compulsory**.
              ii) Figures to the **right** indicate **full** marks.
              iii) **Neat** diagram must be drawn **wherever** necessary.

1. Answer **any eight** of the following :   **16**

    i) Translate the following argument in symbolic form : If my brother stands first in the class, I give him a T-shirt. Either he stood first or I was out of station. I did not give him a T-shirt. Therefore I was out of station. (S, T, O).

    ii) How many four digit numbers can be formed with no digit less than 5 with repetition allowed ?

    iii) In a lattice (L, $\leq$) where L = {0, –1, –2, ...}, what are the greatest and the least elements ? Justify.

    iv) Find first four terms of $\{a_n\}$ where $a_n = a_{n-1} + 3a_{n-2}$, $a_0 = 1$, $a_1 = 2$.

    v) Write adjacency matrix A (G) of the following graph :
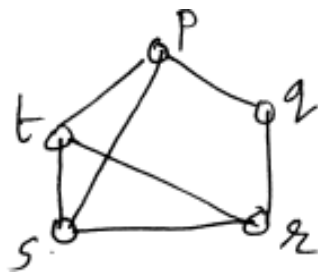
    vi) Draw the graph $k_{3, 4}$ with usual notation.

    vii) Fuse the vertices v_1 and v_3 of the following graph and redraw the graph.
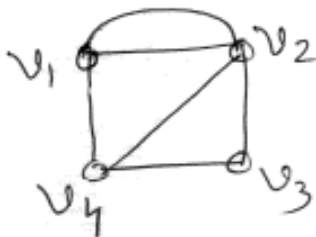
viii) Define strongly connected digraph. Give one example.

ix) Draw a binary tree with 7 vertices having minimum height.

x) Write absorption laws in Logic.

2. Attempt **any four** of the following : **16**

i) Translate the following argument into symbolic form and test its validity by using laws of logic.

If it rains then I carry an umbrella.

If it shines then I do not need a sweater.

Either it rains or it shines. Moreover, I do not need a sweater. Hence I carry an umbrella. (R, C, S, W)

ii) A committee of 5 is to be selected from 6 men and 5 women. Determine the number of ways of selecting a committee if it is to consist of at least one man and one woman.

iii) Solve the recurrence relation

$a_r - 8a_{r-1} + 16a_{r-2} = 0$

with initial conditions $a_2 = 16$, $a_3 = 80$.

iv) Find Conjunctive Normal Form (CNF) of the Boolean function $f(x, y, z) = \overline{x} + (y \cdot (\overline{z} + x))$.

v) How many integers between 1 and 567 are divisible by either 3 or 5 or 7 ?

vi) If B is a Boolean algebra and x, y, z $\in$ B such that $x \wedge y = x \wedge z$ and $x' \wedge y = x' \wedge z$ then prove that y = z.

3. Attempt **any two** of the following : **16**

i) a) Let P = {1, 2, 3, ...10} be a poset whose Hasse diagram is given below.
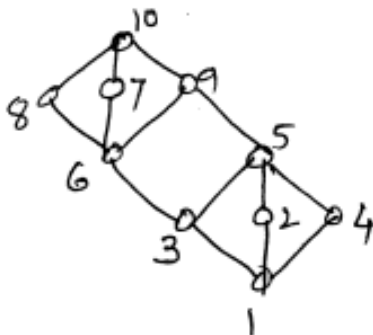
Find glb {2, 3}, glb {2, 7}, lub {3, 2}, lub {3, 5} .

b) Draw Hasse diagram of Lattice D_{12}. Is it a distributive lattice ? Justify.

ii) a) Show that $\sim (p \vee (\sim p \wedge q)) \equiv \sim p \wedge \sim q$ by using laws of logic.

b) Prove that $\sqrt{2}$ is an irrational number by indirect method of proof.

iii) Solve the recurrence relation

$a_n + 3a_{n-1} + 3a_{n-2} + a_{n-3} = n$ where $a_0 = -1$, $a_1 = 2$, $a_2 = 3$.

4. Attempt **any four** of the following : **16**

   i) For the following graph G find degree of each vertex and verify Handshaking Lemma.
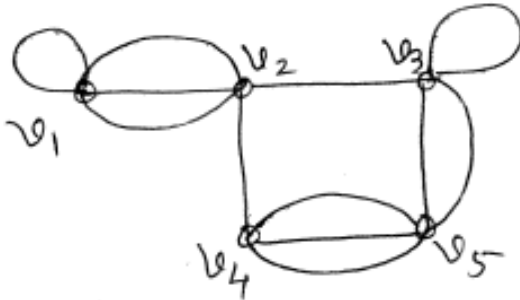
   ii) Find $G_1 \times G_2$ of the following graphs :
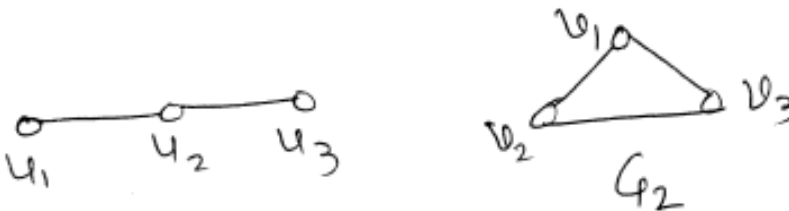
   iii) Prove that the maximum number of edges in a simple graph with n vertices and k components is $\dfrac{(n-k)(n-k+1)}{2}$.

   iv) Use Kruskal's algorithm to find shortest spanning tree of the following graph.
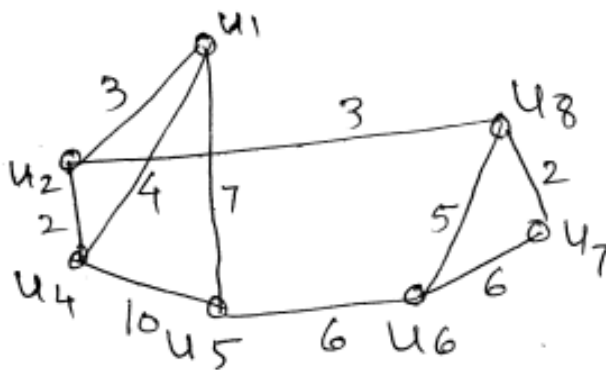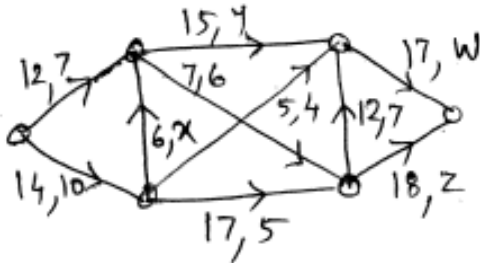

   v) Define the following graphs with **one** example of each.

      a) Asymmetric digraph

      b) Balanced digraph

      c) Weakly connected digraph

      d) Complete symmetric digraph

vi) Find values of x, y, z and w in the following network.

5. Attempt **any two** of the following : **16**

   i) Use Dijkstra's algorithm to find the shortest path from vertex a to every other vertex in the given weighted graph.
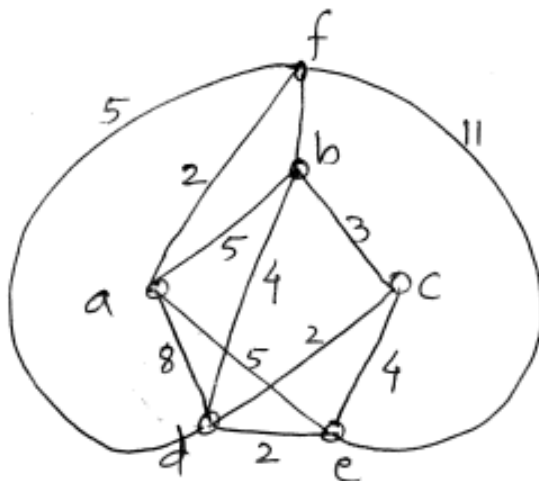
   ii) a) Show that a connected graph G is Eulerian iff it can be decomposed into edge disjoint circuits.

   b) Solve the travelling salesman problem for the following graph G starting from vertex v_5.
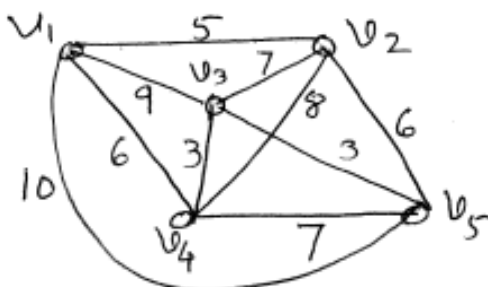
   iii) a) Draw arborescence for the following expression
       $(5x + 8) (7y^3 – 2)^7$
       Hence write the corresponding prefix expression.

   b) Evaluate :
       1) $+ - * 2\ 3\ 5\ /\uparrow 2\ 3\ 4$
       2) $* + 3 + 3 \uparrow 3 + 3\ 3\ 3.$

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Seat No.

F.Y. B.Sc. (Computer Science) Examination, 2014
MATHEMATICS (Paper – II)
MTC – 102 : Algebra and Calculus
(2013 Pattern)

Time : 3 Hours   Max. Marks : 80

Note *: i)* ***All*** *questions are* ***compulsory****.*
ii) Figures to the ***right*** *indicate* ***full*** *marks.*
iii) ***Neat*** *diagrams must be drawn,* ***whenever*** *necessary.*
iv) Use of non programmable battary calculator is ***allowed****.*

1. Attempt **any eight** out of **ten**.   (8×2 = 16)

   1) Let X = {e, f, g, h} construct a relation on X which is symmetric, reflexive but not transitive.

   2) Let f : $\mathbb{R} \to \mathbb{R}$ defined by f(x) = x^2 + 1 and g : $\mathbb{R} \to \mathbb{R}$ defined by g (x) = $\dfrac{1}{x-1}$ find

      g ∘ f(x).

   3) Define a monoid. Give one example.

   4) Prove that if (a, b) = 1 and (a, c) = 1 then (a, bc) = 1

   5) Draw digraph of R = {(a, a), (a, b), (b, c); (b, d), (c, d), (c, e), (d, b), (d, c), (e, a)}

   6) State Intermediate value theorem.

   7) If y = (ax + b)^m. Find Yn.

   8) State Taylor's theorem with Cauchy's form of remainder.

   9) For what value of 'a' does the system has unique solution.

      (a – 3) x + y = 0

      x + (a – 3) y = 0.

   10) Discuss continuity of

      f(x) = $\dfrac{x^2 - 9}{x + 3}$, x ≠ − 3

      = $\dfrac{3}{2}$ x = − 3.

2. Attempt **any four** out of six. **(4×4 = 16)**

   1) Show that $n < 2^n$, $n \geq 3$.

   2) Let Q^+ be set of all positive rational numbers. Let $a, b \in Q^+$. Define $*$ by $a * b = \dfrac{ab}{7}$.

     Show that $(Q^+, *)$ is abelian group.

   3) Let $f : \mathbb{R} \rightarrow \mathbb{R}$ where $f(x) = 3x + 7$. Show that f is bijective. Find f^{-1}.

   4) Prove that if $(a, b) = d$ then $\left(\dfrac{a}{d}, \dfrac{b}{d} \right) = 1$.

   5) Let $A = \{ 1, 2, 3, 4 \}$. Let $R = \{(1, 1), (1, 3), (2, 2), (2, 4), (3, 3), (3, 1), (4, 4), (4, 2)\}$
     Show that R is an equivalence relation. Also find equivalence classes.

   6) Define a cyclic group. Find all generators of cyclic group of order 10.

3. Attempt **any two** out of three. **(2×8 = 16)**

   1) Let $S = \{1, 2, 3, 4, 5\}$

     Let $R = \{ (1, 2), (3, 4), (3, 2), (4, 5), (5, 3), (1, 5)\}$

     Find R^*, transitive closure of R. Also write digraph of R and R^*.

   2) Find g. c. d. (greatest common divisor) of 1 3 5 7 and 1 1 6 6. Also express g. c. d. as 1 3 5 7 m + 1 1 66 n.

   3) Prove that congruence relation $a \equiv b \pmod{n}$ where $n \in \mathbb{N}$, $a, b \in \mathbb{Z}$ is an equivalence relation in $\mathbb{Z}$.
     Write down composition table for $(\mathbb{Z}_5 *, X)$.

4. Attempt **any four** out of **six**. **(4×4= 16)**

   1) Prove that $\displaystyle \lim_{x \to 0} \left(\dfrac{1}{x} - \dfrac{1}{\sin x} \right) = 0$.

   2) If $Y = x^2 \cos x$. Find Y_n.

   3) Verify Lagrange's mean value theorem for

     $f(x) = x (x - 1) (x - 2)$, $x \in \left[0, \dfrac{1}{2} \right]$.

   4) If $f(x) = 1 - \infty < x < 0$

        $= 1 + \sin x$ $0 \leq x \leq \dfrac{\pi}{2}$

        $= 2 + (x - \dfrac{\pi}{2})^2$ $\dfrac{\pi}{2} \leq x < \infty$

     Show that $f(x)$ is continuous at $x = 0$ and $x = \dfrac{\pi}{2}$

5) Define row echelon form. Hence reduce following matrix A to row echelon form.

$$A = \begin{bmatrix} 0 & 1 & 2 & 1 \\ 0 & -1 & 0 & 2 \\ 1 & 2 & 1 & 1 \end{bmatrix}$$

6) Show that $\operatorname{Sin} x = x - \dfrac{x^3}{3!} + \dfrac{x^5}{5!} - \dfrac{x^7}{7!} + \text{ - - -}$

5. Attempt **any two** out of **three**.   **(2×8 = 16)**

1) State and prove Cauchy's mean value theorem. Verify Cauchy's mean value theorem for $f(x) = \cos x$ and $g(x) = \sin x$, $x \in [0, \pi/2]$.

2) a) Expand $f(x) = x^3 - 2x^2 + 3x + 5$ in positive integral powers of $(x - 2)$.

   b) Using Taylor's theorem show that

   $$\lim_{x \to 0} \frac{e^x - (1 + \sin x)}{x^2} = \frac{1}{2}.$$

3) Use LU decomposition to solve following system of linear equations.

   $3x - 6y - 3z = -3$

   $2x + 6z = -22$

   $-4x + 7y + 4z = 3.$

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Seat No.	

F.Y. B.Sc. (Computer Science) Examination, 2014
ELECTRONICS (Paper – I)
ELC-101 : Principles of Analog Electronics
(2013 Pattern)

Time : 3 Hours   Max. Marks : 80

Instructions : 1) *All* questions are *compulsory*.
2) *Neat* diagrams must be drawn *wherever* necessary.
3) Figures to the *right* indicate *full* marks.

1. Attempt **all** of the following :   **(8×2=16)**

   a) Draw the circuit symbol for

   i) Fixed Resistor

   ii) Variable Resistor

   b) Explain concept of ideal voltage source with circuit.

   c) Draw the block diagram of regulted power supply.

   d) Draw DC load line and show two end points of load line.

   e) Define Rinch off voltage of FET.

   f) List any four ideal characteristics of operational amplifier.

   g) State Ohm's law.

   h) Define α and β of BJT.

2. Attempt **any four** of the following :   **(4×4=16)**

   a) Explain working principle of capacitor. Define the terms

   i) Capacitive rectance

   ii) Dielectric strength

   b) Using superposition theorem calculate current in 60Ω resistance.
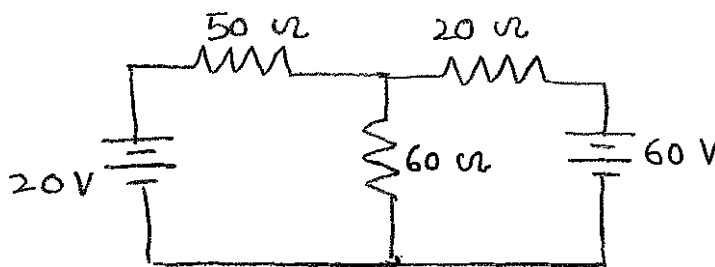
c) Explain the working of PN Junction diode in Forward bias mode.

d) Explain working of NPN transistor.

e) With neat diagram explain working principle of Enhancement MOSFET (E-ONly).

f) Derive an expression for operational amplifier as an adder circuit.

3. Attempt **any four** of the following : **(4×4=16)**

a) Explain working principle of transformer and state types of transformer.

b) For a waveform define following terms :
   i) Amplitude
   ii) Wavelength
   iii) Frequency
   iv) Phase

c) Explain the action of Half wave rectifier circuit.

d) Differentiate between CB, CE and CC of transistor.

e) Explain the action of JFET as Voltage Variable Resistor (VVR).

f) With neat circuit diagram explain the concept of virtual ground.

4. Attempt **any four** of the following : **(4×4=16)**

a) Define with two example each
   i) Active component
   ii) Passive component

b) Find Thevenin's equivalent circuit for the following circuit. Find current across load resistance.
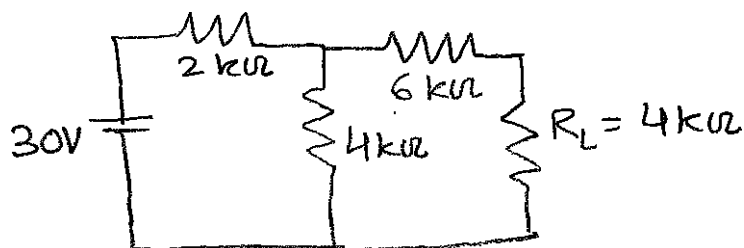
c) Explain the action of diode as a clipper circuit.

d) Differentiate between BJT and FET.

e) Explain the action of transistor as an amplifier.

f) Draw the block diagram of operational amplifier and explain each block.

5. Attempt **any two** of the following :   **(8×2=16)**

     a) i) Explain the working principle of general purpose relay.

        ii) Explain working of RC low pass filter.

     b) i) With neat circuit diagram explain zener diode as voltage regulator.

        ii) Explain the classification of amplifier on the basis of Q point.

     c) i) Explain the action of UJT.

        ii) Identify the following operational amplifier configurations and find their output voltages.

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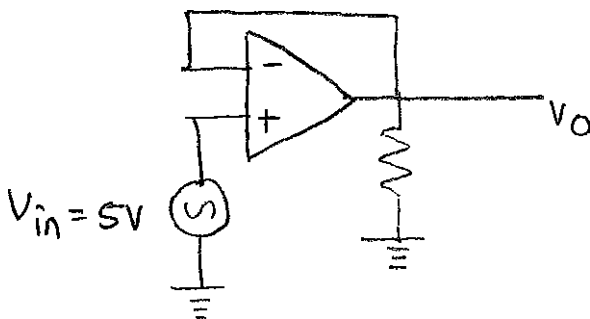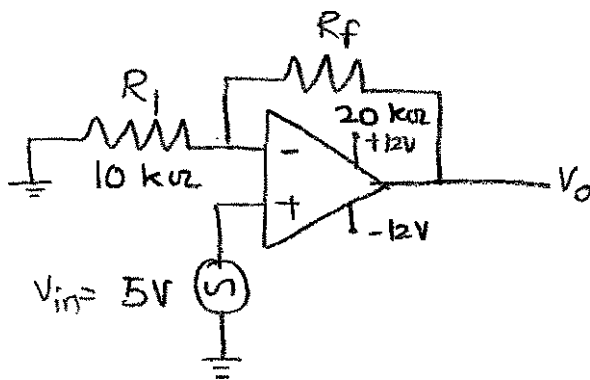
Seat
No.

F.Y.B.Sc. (Computer Science) Examination, 2014
ELECTRONICS (Paper – II)
ELC -102 : Principles of Digital Electronics
(2013 Pattern)

Time : 3 Hours   Max. Marks : 80

Instructions : i) **All** questions are **compulsory**.
                    ii) **Neat** diagrams must be drawn **wherever** necessary.
                    iii) Figures to the **right** indicate full marks.

1. Attempt **all** of the following.   **(8×2=16)**

   a) Draw the logic diagram of 2 to 1 multiplexer.

   b) Write truth table for +ve edge triggered JK Flip Flop.

   c) Draw logic symbol of tristate inverter.

   d) What do you mean by modulus of counter ?

   e) Define decoder.

   f) Draw the logic diagram of half subtractor.

   g) Simplify the equation, y = A (A+B).

   h) Draw logic symbol and truth table of NOR gate and NOT gate.

2. Attempt **any four** of the following.   **(4×4=16)**

   a) Define the following parameters :
      1) Fan out
      2) Switching speed
      3) Power dissipation
      4) Noise Margin

   b) Draw and explain clocked SR Flip Flop using NAND gate.

   c) Draw and explain the logic diagram of 1 : 4 Demultiplexer.

   d) Draw and explain the logic diagram of 3 bit full adder.

   e) State and verify De' Morgan's Theorems.

   f) Perform the following :

      i) $(1101)_{Gray} = (?)_{Binary}$

      ii) $(1000)_{Binary} = (?)_{Gray}$

      iii) $(291)_{10} = (?)_{Excess – 3}$

      iv) $(97)_{10} = (?)_{BCD}$

3. Attempt **any four** of the following. **(4×4=16)**

   a) Draw and explain wired OR operation.

   b) Draw the logic diagram of 3 bit ripple Binary up counter. Write its truth table.

   c) Draw and explain logic diagram of Decimal to Binary converter.

   d) Explain block diagram of ALU.

   e) Simplify the logic expression. $y = \overline{A}B + \overline{A}B\overline{C} + \overline{A}BCD + \overline{A}BC\overline{D}$ using the laws of Boolean algebra. Draw simplified logic diagram.

   f) Draw and explain Ex-OR gate as a parity checker and generator.

4. Attempt **any four** of the following. **(4×4=16)**

   a) Draw and explain the logic diagram of 4-bit universal adder/subtractor.

   b) Construct AND and NOT gate using NOR gate.

   c) Construct MOD7 and MOD2 counters using IC 7490.

   d) Draw and explain the logic diagram of BCD to decimal converter.

   e) Perform the following subtraction using 2's complement method.

   $(110011)_2 - (10011)_2$

   f) Minimize the following logical expression using K-maps.

   $y = \overline{A}\,\overline{B}C + \overline{A}\,\overline{B}\,\overline{C} + AB\overline{C} + \overline{A}B\overline{C} + \overline{A}BC$.

5. Attempt **any two** of the following : **(2× 8=16)**

   a) What do you mean by shift register ? List different types of shift registers. Draw and explain parallel in parallel out shift register with timing diagram.

   b) Write truth table of BCD to seven segment decoder for common anode type display. Draw block diagram that shows use of BCD to seven segment decoder to interface seven segment display. Explain its working.

   c) Perform the following :
   i) $(11011)_2 = (\ ?\ )_{10}$
   ii) $(9806)_{10} = (?)_{16}$
   iii) $(F8A)_{16} = (?)_2$
   iv) $(481)_{10} = (?)_2$

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Seat
No.

F.Y. B.Sc. (Computer Science) Examination, 2014
STATISTICS (Paper – II)
ST-102 : Statistical Methods – II
(2013 Pattern)

Time : 3 Hours   Max. Marks : 80

Instructions :   1) **All** questions are **compulsory**.
   2) *Figures to the* **right** *indicate* **full** *marks*.
   3) *Use of nonprogrammable, scientific calculator and statistical tables is* **allowed**.
   4) *Symbols have their* **usual** *meaning unless otherwise stated*.

1. a) Attempt **each** of the following :   **(1** mark **each)**

   i) If A is an event defined on a sample space then $P(A^C) = $ _____

   ii) The condition for independence of two events A and B is _____

   iii) The variance of exponential distribution with mean θ is _____

   iv) The mean of Pareto distribution with parameter α is _____

   b) Attempt **each** of the following :   **(1** mark **each)**

   i) If A is an event then the conditional probability of A given that event A^C has occurred is

      a) 0.5   b) zero

      c) one   d) none of these

   ii) When a card is drawn from the standard pack of playing cards, which of the following is a pair of disjoint events ?

      a) A queen and an even denomination

      b) A spade and a jack

      c) A heart and a black card

      d) An even denomination and a club

   iii) If $A \subset B$ then the relation between P(A) and P(B) is

      a) $P(A) \neq P(B)$ b) $P(A) = P(B)$

      c) $P(A) < P(B)$ d) $P(A) > P(B)$

iv) The probability of accepting null hypothesis when it is false is

    a) type I error   b) type II error

    c) type I and II errors both   d) none of the above

c) Attempt **each** of the following :   **(2** marks **each)**

  i) Verify whether following function can be considered as a valid probability density function.

$$f(x) = 6x(1-x \; ; \quad 0 \le x \le 1$$
$$0 \quad ; \quad \text{o.w.}$$

  ii) State lack of memory property of exponential distribution with mean θ.

  iii) If X –> N(10, 36), Y –> N(20, 49) and if X and Y are independent, then state the distribution of (X – Y).

  iv) State any two disadvantages of simulation.

2. Attempt **any four** of the following :   **(4** marks **each)**

  a) Explain concept of probability of an event. Also, state the axioms of the probability.

  b) Two cards are drawn randomly from the standard pack of 52 playing cards. Find the probability that they are of same suit. Also, find the probability that they are of same colour.

  c) Discuss combination as counting principle. Illustrate with an example. Also, state the formula.

  d) Find the probability of having 53 Sundays

    i) In a leap year selected at random.

    ii) In a non-leap year selected at random.

  e) Define each of the following with an illustration

    i) mutually exhaustive events

    ii) impossible event.

  f) Five employees in a company out of 20 are postgraduates. If 3 employees are selected at random from these 20 employees, what is the probability that

    i) they all are postgraduates ?

    ii) at least one of them is postgraduate ?

3. Attempt **any four** of the following : **(4** marks **each)**

   a) Define **each** of the following :
      i) An experiment
      ii) Sample space
      iii) Finite sample space
      iv) Countably infinite sample space.

   b) Let A, B and C are mutually exclusive and exhaustive events defined for a random experiment. Find P(A) given that P(B) = 1.5 P(A) and P(C) = 0.5 P(B).

   c) Can two mutually exclusive events be independent ? Can two independent events be mutually exclusive ? Justify your answer.

   d) The time required to repair a machine has exponential distribution with mean 2 hours.
      i) What is the probability that the repair time exceeds 2 hours ?
      ii) What is the conditional probability that a repair takes at least 10 hours given that its repair time exceeds 9 hours ?

   e) Under what conditions a continuous function is said to be a probability density function. Also, state the formula of calculating mean for a continuous random variable with p.d.f.f(x).

   f) Let X follows normal distribution with mean 2 and variance 16. If Y = (3X + 2), find P(Y > 9).

4. Attempt **any two** of the following :

   a) i) State p.d.f. of normal distribution with mean μ and variance σ^2. Explain how poison distribution can be approximated by a normal distribution. **4**

      ii) If X follows uniform distribution in (0, 2) and Y follows exponential distribution with mean θ, find the value of θ such that P(X < 1) = P(Y < 1). **4**

   b) i) Define distribution function of a continuous random variable. State any two properties of the distribution function. **4**

      ii) Twenty patients administered by a certain medicine showed the following blood pressure change. **4**

      7, –6, 3, 1, 6, 4, 9, –5, 9, –7, –3, 7, –9, 8, 6, –4, 4, 9, –6, 1

      Use sign test at 5% l.o.s. to test the hypothesis that the median change in blood pressure is zero against it is not.

   c) i) Describe procedure of run test to test randomness of a sample. **4**

      ii) It was observed that percentage of students failed in term-end examination is 10% over a long period of time. During the current term there were 40 students failed in a group of 300 students. Test at 5% l.o.s., the validity of the observation of 10% failures. **4**

   d) i) Describe Kolmogorov Smirnov one sample test. **4**

      ii) Show the area represented by P(Z $\geq$ 1.5) and P(|Z| < 0.8) on the probability curve of standard normal distribution. **4**

5. Attempt **any one** of the following :

   a) i) Define each of the following terms : **4**

       Null hypothesis,

       Alternate hypothesis

       Parameter

       Test statistic

    ii) A geneticist claims that in the progeny of a certain dihybrid cross, the four phenotypes should be present in the ratio 9 : 3 : 3 : 1. Examination of 800 members of the progeny generation gave the observed frequencies 439, 168, 133 and 60 for the four phenotypes. Are these members in agreement with the claimed ratio at 5% l.o.s. ? **4**

    iii) A random sample of 90 adults is classified according to gender and the number of hours they use Whatsapp on mobile during a week and the following results were observed. **8**

Gender

Using Whatsapp	Male	Female
Over 15 hours	15	29
Below 15 hours	27	19

       Using 1% l.o.s., test the hypothesis that the time spent on using Whatsapp is independent of gender of the person.

   b) i) Describe test procedure to test whether mean of a population differs significantly from μ_0 when sample size is less than 30. **4**

    ii) Find distribution function of a random variable with following p.d.f. **4**

$$f(x) = \begin{cases} (X^2/3); & -1 < x < 2 \\ 0 \; ; & \text{o.w.} \end{cases}$$

    iii) Consider following data on X and Y : **8**

Number of absentees of a student (X)	2	4	5	6	8	11
Number of marks of attendance he scored (Y)	18	12	10	8	7	5

       Compute the value of correlation coefficient between X and Y and test it's significance at 5% l.o.s.

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S.Y. B.Sc. (Computer Science) (Semester – I) Examination, 2014
MATHEMATICS (Paper – I)
MTC-211 : Applied Algebra
(2013 Pattern)

Time : 2 Hours   Max. Marks : 40

Instructions : 1) ***All*** questions are ***compulsory***.

              2) *Figures to the* ***right*** *indicate* ***full*** *marks.*

              3) ***Use*** *of single memory, non-programmable scientific calculator is*
                  allowed*.*

1. Attempt **any five** of the following.   **(5×2=10)**

   i) Determine the values of 'λ' so that the set $\{(\lambda,2), (8,\lambda)\}$ is linearly independent.

   ii) Consider the linear transformation $T : \mathrm{IR}^3 \to \mathrm{IP}_1$, defined by

     $T(a, b, c) = (a + 6b – 2c) + (2a – 4b + c) x$.

     Determine if the vector $\overline{u} = (6, 15, 48)$ belongs to ker T.

   iii) Determine if the following statement is true or false and justify your answer :
     'If the eigenvalues of a matrix A are 0, 2, 2 ; then A is invertible'.

   iv) Find the Hamming distance between x and y ; where x = 110110110 and y = 010110111.

   v) Let $T : \mathrm{IP}_2 \to \mathrm{IR}^4$ be a linear transformation such that rank (T) = 1. Find nullity of T.

   vi) Find the symmetric matrix A such that the quadratic form $x^2 – 4y^2 + z^2 + 4xy – 6xz + 2yz$
     is expressed in the form $X^t AX$.

   vii) Write the definitions of the terms :
     a) cyclic group
     b) normal subgroup

2. Attempt **any two** of the following.   **(2×5=10)**

   i) Find the basis of the subspace of IR^5 spanned by the vectors

     $\overline{u} = (1,-1,0,1,2)$, $\overline{v} = (0,2,-1,3,0)$, $\overline{w} = (-1, 5, -2, 5,-2)$ and $\overline{z} = (1,-3, 1,-2,2)$.

   ii) Find coordinate vector of $\overline{u} = (9,7,5)$ relative to the basis S= { (0, 0, 1), (0, 2, 2), (3,3,3) }

     of IR^3.

   iii) Find maximum value of the quadratic form $2x_1^2 + 2x_2^2 + 6x_1 x_2$ subject to the constraint

     $x_1^2 + x_2^2 = 1$, and determine the values of x_1 and x_2 at which the maximum occurs.

3. Attempt **any two** of the following. **(2×5=10)**

   i) If $T : V \rightarrow W$ is a linear transformation, then prove that KerT is a subspace of V.

   ii) Consider the linear transformation $T : IR^2 \rightarrow IR^2$, defined by $T\left(\begin{bmatrix} x \\ y \end{bmatrix}\right) = \begin{bmatrix} x - 2y \\ -3x + 6y \end{bmatrix}$. Find a basis of range of T and hence find rank (T).

   iii) Verify Cayley-Hamilton theorem for the following matrix A and hence find A^{-1} : $A = \begin{bmatrix} 2 & 1 \\ 2 & 3 \end{bmatrix}$.

4. Attempt **any one** of the following. **(1×10=10)**

   i) Consider the matrix $A = \begin{bmatrix} 1 & 2 \\ 0 & -2 \end{bmatrix}$

      a) Find all eigen-values of A.
      b) Find bases of all eigenspaces of A.
      c) Determine if A is diagonalizable . If yes, find the matrix P that diagonalizes A.

   ii) a) Let $H = \begin{bmatrix} 0 & 1 & 1 \\ 0 & 1 & 1 \\ 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$ be a parity check matrix. Determine (2,5) group code function

      $e_H : B^2 \rightarrow B^5$.

   b) Suppose $e : B^m \rightarrow B^n$ is a group code. Write the procedure for obtaining a maximum likelihood decoding function associated with 'e'.

Seat No.	

S.Y. B.Sc. (Computer Science) (Semester – I) Examination, 2014
MATHEMATICS (Paper – II)
(2013 Pattern)
MTC-212 : Numerical Analysis

Time : 2 Hours   Max. Marks : 40

Instructions : *i)* ***All*** *questions are* ***compulsory.***
                      ii) Figures to the ***right*** *indicate* ***full*** *marks.*
                      iii) ***Use*** *of single memory non-programmable scientific calculator is* ***allowed.***

1. Attempt **any five** of the following :   **(5×2=10)**

   i) Define relative error and percentage error.

   ii) Compute a root of the equation $x^3 + x + 1 = 0$ using Newton Raphson method. (Take $x_0 = -0.5$) perform 2 iterations.

   iii) Show that $\Delta = \dfrac{1}{2}\delta^2 + \delta\sqrt{1 + \dfrac{\delta^2}{4}}$.

   iv) Find the missing term of the data :

x :	1	2	3	4
y :	7	?	13	21

   v) State fundamental theorem for difference calculus and hence evaluate, $\Delta^{10}[(1-x)(1-2x^2)(1-3x^3)(1-4x^4)]$. (Take h = 1)

   vi) State Euler's-Maclaurin's formula for numerical integration.

   vii) Given that $\dfrac{dy}{dx} = x \cdot y$ with y(0) = 1, find y(0.1) by Euler's method.

2. Attempt **any two** of the following :   **(2×5=10)**

   i) Derive Bessel's interpolation formula for central difference.

   ii) Find the number of students from the following data who secured marks not more than 55.

Marks :	30 – 40	40 – 50	50 – 60	60 – 70	70 – 80
No. of students :	35	48	70	40	22

   iii) Given f(3) = 24, f(5) = 120, f(8) = 504, f(g) = 720 and f(12) = 1716. Find f(7) by using Newton's divided difference interpolation formula.

3. Attempt **any two** of the following : **(2×5=10)**

   i) Derive quadrature formula for numerical integration.

   ii) Apply Hermites interpolation formula to obtain a polynomial of degree four from following data :

   x : −1   0   1

   y : 1   1   3

   y′ : −5   1   7

   iii) Evaluate the integral $\int_0^6 \dfrac{1}{1+x^3}$ by using Simpson's $\dfrac{1}{3}^{rd}$ rule (Take h = 1).

4. Attempt **any one** of the following : **(1×10=10)**

   i) a) A solid of revolution is formed by rotating about the x-axis, the area between the x-axis, the line x = 0 and x = 1 and a curve through the points with the following co-ordinates.

x	:	0.00	0.25	0.50	0.75	1
y	:	1.0000	0.9896	0.9589	0.9089	0.8415

   Estimate the volume of the solid formed using Simpson's rule.

   b) Determine the value of y when x = 0.1 by Euler's modified method, given that

   $\dfrac{dy}{dx} = x^2 + y$ with y(0) = 0.94.

   ii) Given $\dfrac{dy}{dx} = y - x$ with y(0) = 2, find y (0.1) and y(0.2) correct to 4-decimal places by using Runge-Kutta method of fourth order.

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S.Y. B.Sc. (Computer Science) (Semester – I) Examination, 2014
ELECTRONICS (Paper – I)
ELC-211 : Digital System Hardware
(2013 Pattern)

Time : 2 Hours   Max. Marks : 40

Instructions : 1) **All** questions are **compulsory**.
2) *Figures to the* **right** *indicate* **full** *marks.*
3) **Neat** *diagram must be drawn* **wherever** *necessary.*

1. Answer the following questions in **one** or **two** sentences.   **(10×1=10)**

   a) Convert $(111011)_2$ into Gray code.

   b) Define Excitation table.

   c) What is CAM ?

   d) Define the term hit and miss in cache memory.

   e) Mention the mapping techniques used in virtual memory.

   f) How many address lines are required to access 256 MB of RAM ?

   g) Mention the operations that can be performed on a stack.

   h) Why is serial communication slow ?

   i) Mention any two features of 8088 processor.

   j) What is a multicore processor.

2. Attempt **any two** of the following :   **(2×5=10)**

   a) Give the function of the following units of 8086

      I) Queue   II) Flag register

    III) BIU   IV) EU

     V) ALU.

   b) Draw the general architecture of a memory and explain the function of various blocks in it.

   c) Design an adder circuit to add three bits A, B and C.

3. Attempt **any two** of the following :   **(2×5=10)**

   a) Draw a truth table for conversion of BCD data to 7 segment output. Also design combinational circuit for segment 'd' using K map.

   b) What is the advantage of a cache ? Explain the direct mapping technique used in cache.

   c) Draw the block diagram of CPU organisation using 7 General purpose registers. Explain the working in brief.

4. Attempt **any one** of the following : **(1×10=10)**

   a) Draw the block diagram of DMA controller. Explain the function of Address register, word count register and control register. **5**

   b) Draw and explain schematic to illustrate how Harard architecture is different than Von Nemann Architecture. **5**

   OR

   a) Give the function of RTS, DTR, TXD and RXD signals of RS 232. **4**

   b) Draw the excitation table and the K maps for the following state diagram. **4**
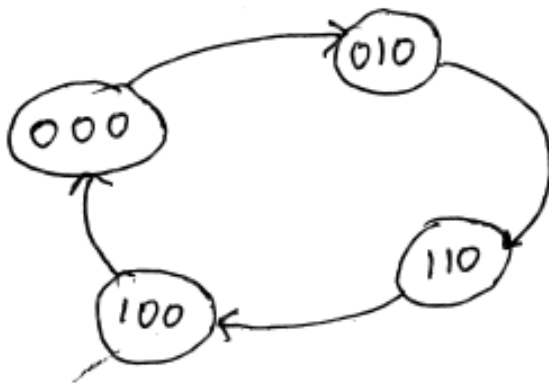
   c) If main memory capacity is 2 KB, virtual memory capacity is 256 KB and page size is 256 bytes, find the number of pages and number of blocks. **2**

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Seat
No.

S.Y. B.Sc. (Computer Science) (Semester – I) Examination, 2014
EN – 211 : ENGLISH
(2013 Pattern)

Time : 2 Hours   Max. Marks : 40

1. A) Attempt **any one** from the following in **100** words.

   1) Describe mars and give its characteristic features.
                        OR

   2) How has development in the science of medicine helped civilization ?

   B) Attempt **any one** from the following in **100** words.

   1) Why does the writer say that Mercury must be a strange place to live in ?
                        OR

   2) What is the scientific point of view ? How does it help us when applied to the events of daily life ?

2. A) Attempt **any one** from the following in **100** words.

   1) Television is a good baby sitter. Support your answers with examples from the text.
                        OR

   2) Analyse the character of Rosemary Fell in 'A cup of Tea'.

   B) Attempt **any one** from the following in **100** words.

   1) Narrate the writer's experience with the photographer.
                        OR

   2) Why did Rosemary bring the poor lady home ? What was her husband's reaction ?

3) A) Fill in the blanks adding prefixes or suffixes to the words in the brackets (**any 5**).

   1) It is a very _____ (wind) day.

   2) I have a _____ (paid) card.

   3) Could you _____ (tie) the child's shoe laces ?

   4) Chetan had to go to Mumbai _____ (urgent)

   5) It was a _____ (tax) movie.

   6) Isha was _____ (regular) in class.

   7) Mohit was _____ (clue) about the plan.

P.T.O.

B) Combine words from A and B to form commonly used collocations.

A	**B**
1) grant	code
2) heavy	crime
3) dress	traffic
4) fulfil	permission
5) commit	dream.

4. A) Do as directed (**any 5**).

1) We had an exciting trip. (change into exclamatory sentence)

2) A documentary on the white tiger is being made by the Films Division. (change into active voice)

3) Niti apologised to shobha for losing her bracelet. (change into direct speech)

4) I watered the plants regularly but they withered. (change into a complex sentence)

5) Inspite of getting up early, she missed the train. (change into a compound sentence)

6) Hamid cycles to college everyday. (change into an interrogative sentence)

7) The nurse said to the patient, " Has the pain become worse ?" (change into reported speech)

B) Fill in the blanks with appropriate tense forms taking clues from the brackets.

1) We _____ (sell) our house in Delhi. (simple past)

2) I _____ (write) a poem. (present progressive)

3) He _____ (go) shopping. (past perfect tense)

4) The engine _____ (run) for six hours. (present perfect progressive)

5) Shruti _____ (join) an art school. (simple future)

6) At 6.00 p.m tomorrow, I _____ (stand) in front of the gathering. (future progressive)

7) Sharavan _____ (live) in his cantonment residence. (simple present).

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Seat
No.

S.Y. B.Sc. (Comp. Science) (Semester – I) Examination, 2014
MATHEMATICS (Paper – II)
(2008 Pattern)
MTC-212 : Numerical Analysis

Time : 2 Hours   Max. Marks : 40

Instructions : *i) **All** questions are **compulsory**.*
*ii) Figures to the **right** indicate **full** marks.*
*iii) **Use** of single memory, non programable scientific calculator is allowed.*

1. Attempt **all** of the following : **(10×1=10)**

    i) Round of 0.456789 correct to four significate digits and then find relative error.

    ii) Evaluate $\Delta\left(\dfrac{2^x}{x!}\right)$. (Take h = 1).

    iii) Compute $\sqrt{27}$ by using Newton-Raphson method.

    (Take x_0 = 5, Perform 2 iteration).

    iv) Prove that $\Delta\nabla = \delta^2$.

    v) Evaluate $\Delta^4[(1-x)(1-2x)(1-3x)(1-4x)]$, (Take h = 1).

    vi) Write trapezoidal rule for numerical integration.

    vii) Given f(x) = x^2, find [a, b, c].

    Where [a, b, c] is second order divided difference.

    viii) Write Lagranges interpolation formula for unequal interval.

    ix) Given that $Y' = -Y$ with Y(0) = 1. Find Y(0.1) by Euler's method.

    x) Write Runge-Kutta formula of second order for ordinary differential equation.

2. Attempt **any two** of the following : **(5×2=10)**

    i) Use Regula Falsi method to find approximate root of the equation $x^3 + x - 1 = 0$ in the interval [0, 1] correct upto 2-decimal places.

    ii) Find the cubic polynomial which takes the following values

x :	0	1	2	3
y :	1	2	1	10

P.T.O.

iii) Solve the following system of equations by Gauss Seidal method

$20x + y - 2z = 17$

$3x + 20y - z = 18$

$2x - 3y + 20z = 25$

3. Attempt **any two** of the following : **(5×2=10)**

i) State and prove Newton's forward interpolation formula for equal intervals.

ii) From the following data. Find $\dfrac{dy}{dx}$ at x = 1.1.

x :	50	51	52	53	54	55	56
y :	3.6840	3.7084	3.7325	3.7563	3.7798	3.8030	3.8259

iii) Use Newton's divided difference interpolation formula to obtain f(g) where

x :	5	7	11	13	17
f(x) :	150	392	1452	2366	5202

4. Attempt **any one** of the following : **(10×1=10)**

i) a) State and prove Simpson's $\left(\dfrac{1}{3}\right)^{rd}$ rule for numerical integration.

b) Determine the value of y when x = 0.05 by Euler's modified method, given that $\dfrac{dy}{dx} = x + y$ with y(0) = 1.

ii) a) Evaluate the value of $\displaystyle\int_0^1 \dfrac{1}{1+x^2}\,dx$ by Simpson's $\left(\dfrac{3}{8}\right)^{th}$ rule. $\left(\text{Take } h = \dfrac{1}{6}\right)$.

b) Given that $\dfrac{dy}{dx} = x + y^2$ with y(0) = 1. Find y(0.1) by Runge-Kutta method of fourth order.

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Seat No.	

S.Y. B.Sc. (Computer Science) (Semester – I) Examination, 2014
ELECTRONICS (Paper – I)
ELC-211 : Microprocessor Architecture and Programming
(2008 Pattern)

Time : 2 Hours   Max. Marks : 40

Instructions : 1) ***All*** questions are ***compulsory****.*

2) *Figures to the* ***right*** *indicate* ***full*** *marks.*

3) ***Neat*** *diagram must be drawn* ***wherever*** *necessary.*

1. Answer the following in **one** or **two** sentences :   **(10×1=10)**

   a) If FULL = 1 and EMPTY = 0 what will be the status of register stack ?

   b) Define volatility of the memory.

   c) Give full form of "PCMCIA".

   d) How much memory space is addressable in real and protected mode ?

   e) What is superscalar architecture of advanced microprocessor ?

   f) Which interrupt is used to detect power failure ?

   g) Give the instruction to disable INTR flag.

   h) Which function of DOS interrupt INT21H is used to display string on console ?

   i) Define assembler.

   j) What is the data type declared by following statements

   TEMP : dw 20H

   ERROR : db 30H

2. Attempt **any two** of the following :   **(2×5=10)**

   a) Explain register organization of CPU with 7-registers. Draw neat block diagram.

   b) Explain any five addressing modes with example.

   c) Write assembly language program to convert decimal number to binary number.

3. Attempt **any two** of the following :   **(2×5=10)**

   a) Explain following functional blocks of pentium architecture
       i) Bus interface unit
       ii) Floating point unit

   b)   i) Write a note on single-step interrupt.   **3**
        ii) Differentiate between compiler and cross compiler.   **2**

   c) Write assembly language program to arrange a string in ascending direction.

4. Attempt **any one** of the following :   **(1×10=10)**

   a) What is cache mapping ? Explain associative cache mapping in details.

   b)   i) How segment registers are used to convert logical address in to physical address ?
        Explain with example.   **3**
        ii) Why I/O interface unit is needed between CPU and peripheral devices ?   **2**

                        OR

   a) Explain how IVT helps in processing interrupts ? Draw the structure of IVT in pentium.

   b) Write a assembly language program to accept 5 numbers from keyboard and display
       them on console.

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Seat
No.

S.Y. B.Sc. (Computer Science) (Semester – I) Examination, 2014
ELECTRONICS – (Paper – II)
ELC – 212 : Communication Principles
(2008 Pattern)

Time : 2 Hours   Max. Marks : 40

Instructions : 1) **All** questions are **compulsory**.
　　　　　　　　　2) Figures to the **right** indicate **full** marks.
　　　　　　　　　3) **Neat** diagram must be drawn **whenever** necessary.

1. Answer the following questions in **one** or **two** sentences.   **(10×1=10)**

   a) State any two protocols used in GSM.

   b) What is the need of a Guard band in FDM ?

   c) What is Companding ?

   d) "16 QAM is a combination of ASK and PSK". Comment.

   e) State any two Multiple access techniques.

   f) What do you mean by Omni directional antenna ?

   g) How many characters are there in EMS ?

   h) State any two types of RFID tags.

   i) State Nyquist Sampling theorem.

   j) If Vc = 15v and Vm = 6v. Calculate the modulation index for an AM system.

2. Attempt **any two** of the following :   **(2×5=10)**

   a) Explain the types of communication with reference to the transmission modes.

   b) What is multiplexing ? Explain CDM and SDM in short.

   c) Define the following antenna parameters :

      i) Radiation intensity

      ii) Directivity

      iii) Gain

      iv) Bandwidth

      v) Polarization.

P.T.O.

3. Attempt **any two** of the following : **(2×5=10)**

    a) Explain GSM architecture with a neat block diagram.

    b) Explain PCM in detail with appropriate diagram.

    c) State the important features of TDMA.

4. Attempt **any one** of the following: **(1×10=10)**

    a) i) Differentiate between Infrastructured and Ad-hoc network.

    ii) Explain Delta modulation technique with a neat block diagram of Transmitter section.

    OR

    b) i) Explain the Frequency Re-use and Hand-off technique in mobile communication.

    ii) Differentiate between Synchronous and Asynchronous communication.

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Seat
No.

F.Y. B.Sc. Examination, 2014
COMPUTER SCIENCE (Paper – II)
File Organization and Fundamental of Databases
(2008 Pattern)

Time : 3 Hours   Max. Marks : 80

Instructions : *1)* ***Neat*** *diagrams must be drawn* ***wherever*** *necessary.*
  2) Figures to the ***right*** *indicate* ***full*** *marks.*
  3) Assume suitable data if ***necessary****.*

1. Attempt **all** of the following.   **(10×1=10)**

   a) What are the different levels of abstraction of a database schema?

   b) What is a NULL attribute value ?

   c) Give the different types of multi level ordered structures.

   d) Define Database Management System.

   e) What is a Prime attribute ?

   f) Which are the binary operators in relational algebra ?

   g) What is the inner join operation in SQL ?

   h) What is the unique constraint ?

   i) What is the generalized structure of SQL query ?

   j) Define First Normal form.

2. Answer **any four** of the following.   **(4×5=20)**

   a) Explain dense index and sparse index with example.

   b) What are the disadvantages of traditional file system ?

   c) What is decomposition ? Why is it necessary ?

   d) Explain aggregation with example.

   e) Define :
   1) Transitive dependency
   2) Partial dependency

3. Answer **any four** of the following.   **(4×5=20)**

   a) What is the referential integrity constant ? Explain in brief with example.

   b) Write a note on sequential files.

   c) Write a short note on multi valued dependency.

   d) What is the difference between weak entity set and strong entity set ? Explain with example.

   e) What is Normalization ? Give the algorithm for $3\mu F$ decomposition.

4. A) Attempt **any three** of the following.   **(3×5=15)**

   a) Consider the following relations :
      Department (<u>d-no</u>, name, manager-name)
      Project (<u>P-no</u>, name, description, budget)
      Department and project are related with one to many relationship. Create a relational database in $3\mu F$ and solve the following queries in SQL.

      i) Find the names of departments having projects with budgets greater than 2,00,000.
      ii) List all the projects which are managed by the 'R & D' department.
      iii) Give department wise list of projects.

   b) Consider the following relations :
      Company : (<u>c-id</u>, C-name, region, State)
      Branches (<u>b-id</u>, b-product, city)
      Company and Branches are related with one to many relationship. Create a relational database in $3\mu F$ and solve the following queries in SQL.

      i) List all the cities having the branch product 'Hard disk'.
      ii) Count company wise branches.
      iii) List all the products of all branches of the company 'shree Enterprises'.

   c) Consider the following relations.
      Doctor (<u>d-no</u>, name, specialization)
      Hospital (<u>h-no</u>, name underlineaddress)
      Doctor and Hospital are related with many to many relationship with the descriptive attribute day. Create a relational database in $3\mu F$ and solve the following queries in SQL.

      i) List all doctors visiting 'Sanjivani Hospital' on Monday.
      ii) List the names of hospitals where more than 10 doctors are visiting.
      iii) Find all the hospitals that 'Dr. Kelkar' is visiting on Saturday.

   d) Consider the following relation.
      Item (<u>i-no</u>, i-name, price)
      Order (<u>o-no</u>, date, customer-name)
      Item and order are related with many to many relationship with the descriptive attribute quantity. Create a relational database in $3\mu F$ and solve the following queries in SQL.

      i) List all the items which are ordered by 'Mr. Josh'.
      ii) Find the item which has been ordered in Maximum quantity.
      iii) List all the items and their quantities that are present in the order no- '123'.

4. B) Attempt **any one** of the following : (1×5=5)
   a) Consider the following relations.
      Player (P-no, name, city)
      Game (g-no, gname)
      Play-gm (P-no, g-no, date)
      Solve the following queries in relational algebra
       i) Give the names of players playing 'Badminton'.
       ii) List all the games that 'Ms. Jadhav' has played on '14/3/14'
       iii) List all players in the 'Pune' city.
       iv) Find all players playing 'football' and 'Vollyball'.
       v) Give the list of players and games played on '31/12/13'
   b) Consider the following relations.
      Musician (m-no, name, age, city)
      Instrument (i-no, name)
      Plays (m-no, i-no)
      Solve the following queries in relational algebra.
       i) Find all 'violin' players who stay in 'Mumbai'.
       ii) List all instruments played by 'Mr. Sen'.
       iii) Find all musicians between age 20 and 50.
       iv) Find all musicians who play both' tabala' and 'dholaki'.
       v) Give musicians wise list of instruments played.

5. A) An R.T.O. administers driving tests and issues drives licenses. A person who wants a license, must just take a learners exam at one of the R.T.O.; branches. If he/she fails, they have to reappear for the exam after one week. If he passes the exam, the person is issued a learner license. Which has a unique license no. The learning license expires in six months. The person may take his final driving exam at any RTO branch before six months after which he is issued a permanent driving license.

   Based on the above information.
    i) Design an ER diagram
    ii) Convert the ER diagram into relational database in $3\mu F$. 7

   B) Explain symbols which are used to draw Entity Relationship diagram. 3
                  OR
   B) Explain what is DDL with example. 3

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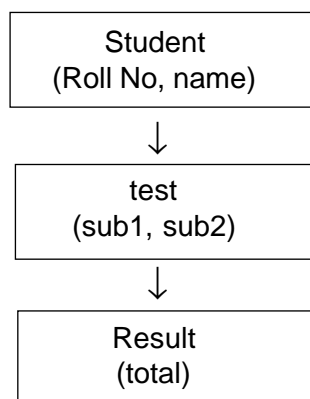### S.Y. B.Sc. (Semester – II) Examination, 2014
COMPUTER SCIENCE
CS – 221 : Object Oriented Concepts and Programming in C++
(2008 Pattern)

Time : 2 Hours   Max. Marks : 40

Instructions : 1) **All** questions are **compulsory**.
                  2) Figures to the **right** indicate **full** marks.
                  3) Assume suitable data if **necessary**.

1. Attempt **all** of the following :   **(1×10=10)**

   a) What is the difference between a class and a structure in C++ ?

   b) Write any two advantages of object oriented programming.

   c) "A function can be overloaded more than once". State true or false.

   d) Write the purpose of copy constructor.

   e) Write the operators which can not be overloaded using friend function.

   f) How to create an abstract class in C++ ?

   g) What is the use of setfill () manipulator ?

   h) State the purpose of catch (...).

   i) What defines a general set of operations that will be applied to various types of data ?

   j) Give syntax for seekg() function.

2. Attempt **any two** of the following :   **(2×5= 10)**

   a) What is a constructor ? Give its types. Also explain any one with example.

   b) Consider the following class hierarchy :

```
        ┌─────────────────┐
        │    Student       │
        │  (Roll No, name) │
        └─────────────────┘
                 ↓
        ┌─────────────────┐
        │      test        │
        │  (sub1, sub2)    │
        └─────────────────┘
                 ↓
        ┌─────────────────┐
        │     Result       │
        │    (total)       │
        └─────────────────┘
```

   Write appropriate member functions in each class. Also write a code to accept information
   of 'n' students and display their result.

P.T.O.

c) Consider the following class declaration :-

Class Integer

{   iut a, b ;

     ⋮

};

Overload insertion and extraction operators, also define min() and max() as member function to find minimum and maximum from a and b.

3. Attempt **any two** of the following : **(2×5 = 10)**

   a) What is a virtual base class ? Explain with example.

   b) Explain this pointer with suitable example.

   c) Consider class Inventory :

Class Inventory

{ Public : Char itemname [10];

        iut code, cost;

} ;

A binary file "items.bin" contains 100 objects of the above class. Write a program to read the file and display all items having cost > Rs. 200.

4. Attempt **A** or **B**. **(1×10=10)**

  A) 1) What are the advantages and limitations of an inline function ? **4**

      2) Write a short note on multiple catch. **3**

      3) Give various file opening modes and state their purpose. **3**

                 OR

  B) 1) Explain static data members and member functions with example. **4**

      2) Explain overloading of template function with example. **3**

      3) Give the output of the following code segment and justify : **3**

```
Class A
{    Public : void display()
              {  Cout << "A"; }
} ;
Class B : Public A
{ Public : void display()
          { cout << "B"; }
};
void main ()
{    A + Ptr;
     Ptr = new A;
     Ptr → display ();
     Ptr = new B;
     Ptr → display ();
}
```

—————————

Seat No.	

S.Y. B.Sc. (Computer Science) (Semester – II) Examination, 2014
CS-222 : SOFTWARE ENGINEERING (Paper – II)
(2008 Pattern)

Time : 2 Hours   Max. Marks : 40

Instructions :   *1)* ***All*** *questions are* ***compulsory.***
                          2) ***All*** *questions carry* ***equal*** *marks.*
                          3) *Figures to the* ***right*** *side indicate* ***full*** *marks.*
                          4) *Assume suitable data if* ***necessary.***

1. Attempt **all** of the following :   **(1×10=10)**
   a) Define Software engineering.
   b) What is Refactoring ?
   c) State the goal of TSP.
   d) What is the benefit of prototyping ?
   e) Enlist two communication principles.
   f) What is embedded software ?
   g) List the phases of waterfall model.
   h) What is requirement validation ?
   i) Define cardinality.
   j) What does "win-win" mean in context of negotiation during requirement engineering activity ?

2. Attempt **any two** of the following :   **(5×2=10)**
   a) Explain with diagram RAD process model and its advantages.
   b) State and explain any five principles of design modeling.
   c) What is QFD ? What types of requirements does QFD contain ? Explain requirements with example.

3. Attempt **any two** of the following :   **(5×2=10)**
   a) State and explain any five umbrella activities with example.
   b) What are the major activities involved in spiral model ? Explain with diagram.
   c) Write a note on data object, data attribute with proper example.

4. Attempt **any two** of the following :   **(5×2=10)**
   a) What is ASD ? Explain the different phases of ASD with diagram.
   b) Explain different restraining factors considered in system modeling.
   c) What are the two advantages of analysis patterns ? How is a analysis pattern represented ?

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Seat
No.

S.Y. B.Sc. (Semester – II) Examination, 2014
(Computer Science)
ELECTRONICS (Paper – I)
ELC -221 : Microcontroller and Embedded Systems
(2008 Pattern)

Time : 2 Hours   Max. Marks : 40

Instructions :   1) **All** questions are **compulsory.**
                             2) Figures to the **right** indicate **full** marks.
                             3) **Neat** diagrams must be drawn **wherever** necessary.

1. Answer the following in **one** or **two** sentences.   **(1×10=10)**

    a) What is the size of DPTR and PC in 8051 micro controller ?

    b) Give the function of $\overline{PSEN}$ pin of 8051 microcontroller.

    c) Which port requires 10KΩ pull-up resister to be connected externally.

    d) Write the function of the instruction JB.

    e) How many timer registers are there in 8051 ?

    f) Which timer is used to set the band rate in 8051 and in which mode should it be used ?

    g) Calculate the stepsize for 8 bit ADC 0804 if V_{in} = 2.56 V.

    h) What is a cross assembler ?

    i) Give the function of Emulator.

    j) Define Loader.

2. Attempt **any two** of the following.   **(2×5=10)**

    a) Explain with help of an example at least five addressing modes of 8051 microcontroller.

    b) In 8051, what is the priority of interrupts upon reset ? Explain with a neat table the interrupts
       with their priorities and corresponding memory locations.

    c) With a neat block diagram explain the components of an embedded system (any four
       components)

P.T.O.

3. Attempt **any two** of the following. (2×5=10)

   a) Explain the alternate functions of Port 3 pins.

   b) With a neat diagram show how DAC 0808 is interfaced to 8051. Write an assembly language program to generate triangular waveform.

   c) How are embedded systems classified with respect to their size ?

4. Attempt **any one** of the following. (1×10=10)

   A) a) i) Give two differences between a microcontroller and a microprocessor. **2**

      ii) Draw the format of SCON register and explain TI and RI bit of SCON register. **3**

      b) Write a program to generate square wave of 1 KHZ on pin P2.4 of 25% duty cycle using assembly language. Assume XTAL = 12 MHz and Timer 1 mode 1. **5**

   B) a) With a neat block diagram explain PSW register. **5**

      b) i) Draw the format of TMOD register. Which instruction is used to turn Timer 1 off ? **2**

      ii) Explain the function of the following LCD pins – RS, R/W and EN. **3**

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Seat
No.

S.Y. B.Sc. (Computer Science) (Semester – II) Examination, 2014
ELECTRONICS (Paper – II)
ELC-222 : Digital Signal Processing
(2008 Pattern)

Time : 2 Hours   Max. Marks : 40

Instructions : 1) *All* questions are *compulsory*.

2) *Figures to the* **right** *indicates* **full** *marks*.

3) **Neat** *diagram must be drawn* **wherever** *necessary*.

1. Answer the following questions in **one** or **two** sentences :   **(10×1=10)**

   a) Name the transform which converts time domain signal into s-domain.

   b) What are periodic signals ?

   c) Give any two parameters of sound signal.

   d) What is use of I- cache ?

   e) What are advantages of digital filter ? Mention any two.

   f) Represent following discrete signal into tabular form :

      {....., 0, –3, –2, $\underset{\uparrow}{1}$ –1, 2, –4, 0, ...}

   g) Sketch ideal response for low pass filter.

   h) What is role of circular buffer in DSP system ?

   i) Give any two specifications of ADC.

   j) Define impulse signal.

2. Attempt **any two** of the following :   **(5×2=10)**

   a) Give steps involved in filter design using impulse invariant and BLT methods.

   b) Explain Von Neumann and Harvard architecture.

   c) Draw and explain block diagram of RADAR system.

P.T.O.

3. Attempt **any two** of the following : **(5×2=10)**

a) With the help of block diagram explain DSP system.

b) How signal analysis is carried out in s-domain ?

c) Compare digital signal processor with traditional microprocessor.

4. Attempt **any one** of the following : **(10×1=10)**

a) i) Explain sigma Delta DAC.

   ii) Define correlation and explain its types.

              OR

b) i) How interference is rejected using adaptive filters ?

   ii) Find convolution of following signal :

      X (n) = {1, 2, –2, –1} and h (n) = {–3, 2, –2}

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Seat
No.

S.Y. B.Sc. (Computer Science) (Semester – II) Examination, 2014
COMPULSORY ENGLISH
(2008 Pattern)

Time : 2 Hours   Max. Marks : 40

1. Answer **any two** of the following :   **10**

   1) Sameena, Ranjit, Sarswati and Deepak are asked to have a group discussion on "Uses and Abuses of Social Networking". Write the transcript in a dialogue form.

   2) State the special features of formal meeting.

   3) You are attending an interview for the post of computer programmer. Write down 5 questions along with their responses.

2. Answer **any two** of the following :   **10**

   1) Rearrange the jumbled sentences given below to form a well written paragraph.

      a) There are direct intellectual effects : the dispelling of many traditional beliefs, and the adoption of others suggested by the success of the scientific method.

      b) Then, chiefly as a consequence of new techniques, there are profound changes in social organization, which are bringing about corresponding political changes ?

      c) The effects of science are of various very different kinds.

      d) Then there are effects on technique in industry and war.

      e) Finally, as a result of the new control over the environment which scientific knowledge has conferred, a new philosophy is growing up, involving a changed conception of the place of human beings in the universe.

   2) Write a review of a book which you have read recently.

   3) Write a paragraph on "female foeticide".

3. Answer **any two** of the following :   **10**

   1) Select the most appropriate verb given in the bracket.

      a) He _____ the kite flying high above his head. (looked at/ squinted at)

      b) The stars _____ in the night sky. (shone/shined)

      c) The little girl _____ in pain when a sharp thorn pierced her through her shoe. (cried/howled)

      d) The children on the bus _____ constantly on their way home. (talked/chattered)

      e) I was hungry so I _____ my food quickly. (gobbled up/ate up)

P.T.O.

2) Write a description of a person who sat opposite you on a train journey. Remember to use words to convey what the character, thoughts and mood of the person seemed to be.

3) Summarize the passage.

A knowledge of grammar is indispensible for correctness in writing and speaking, by which one is often judged. Grammar is difficult and has to be studied as a whole without ommitting any part. Therefore, it does require patient effort which however need not encroach into time required for business or exercise. Hours wasted in gossip over tea and coffee during one year will suffice. Once the subject is mastered, one can derive pleasure and profit from it and become a correct speaker and writer for life.

The author learned grammar by himself, as a private soldier, under the most difficult conditions. Then no young man, however poor or busy, can have an excuse for not learning it.

4. Answer **any two** of the following :　　　　　　　　　　　　　　　　　　**10**

1) Imagine that you are the principal of your college. Send an e-mail to the past students to attend the "Alumni Meet" organized by the college.

2) What audio-visual aids would you use for classroom teaching ?

3) Prepare 5 slides of about 20 words each for power point presentation on launching a new product in the market.

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Seat
No.

T.Y.B.Sc. (Computer Science) (Semester – III) Examination, 2014
CS-331 : SYSTEMS PROGRAMMING AND OPERATING SYSTEM – I (Paper – I)
(2008 Pattern)

Time : 2 Hours   Max. Marks : 40

*Instructions : 1) **Neat** diagram must be drawn **whenever** necessary.*
*2) Figures to the **right** indicate **full** marks.*
*3) **All** questions are **compulsory**.*

1. Attempt **all** of the following.   **(10×1=10)**

   a) Define the term 'overlays'.

   b) List the different types of editor.

   c) Define the term 'basic block'.

   d) List any two advantages of display.

   e) Define the term 'macro'.

   f) "Debuggers are used for executing program". True/False ? Justify.

   g) Define the term 'Dynamic binding'.

   h) State any two advantages of p-code compiler.

   i) "Local expansion time variables are created by LCL statement" True/False ? Justify.

   j) What is the purpose of LTORG statement ?

2. Attempt **any two** of the following :   **(2×5=10)**

   a) What are the different factors affecting pass structure of an assembler ?

   b) Explain implementation of dynamic memory allocation using stack and heap with example.

   c)   MACRO

              CALC & X, & Y, *OP = MULT, &LAB =

      &LAB MOVER   AREG, &Y

           &OP   AREG, &Y

           MOVEM   AREG, &X

           MEND

   Discuss the different data structures used in the above macro definition while processing the following macro call.

   CALC A, B, LAB = LOOP.

3. Attempt **any two** of the following : **(2×5=10)**

   a) Construct triple and indirect triple for the following strings.

      a + b * c + d * e ↑ f & x + b * c

   b) Write a note on designing of a Macro assembler.

   c) Discuss the various issues related to program listing and error reporting of an assembler.

4. Attempt **any one** (**A** or **B**) : **(1×10=10)**

   A) i) Generate intermediate code variant I for the following assembly language program and also show that content of SYMTAB, LITTAB, POOLTAB.

      START 200

      MOVER   AREG, = '5'
      MOVER   BREG, = '1'
      MOVER   BREG, A
      LTORG

      MOVER   CREG, = '3'
      MOVER   DREG, = '1'
      MOVER   CREG, B
      LTORG

      MOVER   BREG, = '5'
      MOVER   BREG, = '5'
      PRINT   A
      STOP
   A DS   1
   B DC   '2'
      END

   ii) What are the features of SMACO ? **3**

   iii) Define pure interpreter and impure interpreter. **2**

   OR

   B) i) What is linker, loader ? Explain the different functions performed by the loader. **5**

      ii) Write a short note on code optimization. **3**

      iii) Give the syntax and use of AIF and AGO statement. **2**

   _____

Seat
No.

T.Y. B.Sc. (Computer Science) (Semester – III) Examination, 2014
CS – 333 : COMPUTER NETWORKS – I (Paper – III)
(2008 Pattern)

Time : 2 Hours   Max. Marks : 40

Instructions : 1) **All** questions are **compulsory**.
　　　　　　　　2) **Neat** diagrams must be drawn **wherever** necessary.
　　　　　　　　3) Black figures to the **right** indicate **full** marks.
　　　　　　　　4) **All** questions carry **equal** marks.

1. Attempt **all** of the following :   (10×1=10)

   a) Define the term : protocol stack.

   b) Discuss error control responsibility of data link layer.

   c) Define the term : Hamming distance.

   d) State an important property of circuit switching.

   e) Apply bit stuffing method on the following data containing flag pattern as : 01111110.

   f) Name the channelization method in which the available bandwidth of the common channel is divided into bands that are separated by guard bands.

   g) State the formula to calculate maximum length for traditional Ethernet.

   h) Name the protocol that supports synchronous and asynchronous circuits and byte-oriented and bit oriented encoding.

   i) What is the idea behind pure ALOHA ?

   j) State the concept of frame bursting used in MAC sublayer of Gigabit Ethernet.

2. Attempt **any two** of the following :   (2×5=10)

   a) Explain : resource sharing, distribution of workload, expandability, saving money and preserving information goals of computer network.

   b) What is piggybacking technique ? State the advantages and disadvantages of piggybacking technique.

   c) State the topology used by fast Ethernet. Also write a note on implementation of fast Ethernet.

3. Attempt **any two** of the following : **(2×5=10)**

   a) Write a note on organization of the layers and interfaces between layers of OSI reference model.

   b) Calculate the total Latency (Delay) for a frame of size 4 million bits which is sent on a link with 5 routers, each having queuing time of 3μ s and a processing time of 1μ s. The length of the link is 2000 km and speed of light is 2×10^8 M/s in the link. The link has bandwidth 5 Mbps.

   c) Explain any two strategies of collision avoidance in CSMA/CA method.

4. Attempt **A** or **B** of the following :

   A) i) Show RZ and Manchester line coding scheme for the following bit pattern : 0100110011010. **4**

      ii) Explain with suitable example, the drawback of character count method. **4**

      iii) State and explain two distinct components of wide area networks. **2**

   B) i) Explain any four factors affecting protocol efficiency. **4**

      ii) Write a note on specific services provided by the application layer of OSI reference model. **4**

      iii) Explain with suitable example, calculation of inner product of two equal sequences and of two different sequences in CDMA method. **2**

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Seat
No.

T.Y. B.Sc. (Semester – III) Examination, 2014
COMPUTER SCIENCE (Paper – IV)
CS-334 : Web Development and Php Programming – I
(2008 Pattern)

Time : 2 Hours   Max. Marks : 40

Instructions : 1) *All* questions are *compulsory*.
                  ii) *Figures to the* *right* indicate *full* marks.

1. Attempt **all** of the following :   **(10×1=10)**

   a) What is process of running php script ?

   b) Find the output

   ```php
   <? php
           goto jumpToHere;
           echo "Hello";
           jumpToHere:
           echo "World";
   ?>
   ```

   c) "PHP is not known as loosely typed languages." Justify true or False.

   d) How to check if given number is integer or not ?

   e) Give any two bitwise operator supported by php ?

   f) Write php code to define constant PI with value 3.142.

   g)
   ```php
   <? php
   $ widget = 23;
   $ plenty = "We have plenty of widgets in stock";
   $ few = "Less than 10 widgets left Time to order some more";
   echo ($ widget > = 10)? $ plenty : $ few ;
   ?>
   ```

   h)
   ```php
   <? php
   for ($i = 1; $i < = 3; $i++)
   echo "I have counted 10:$i";
   ```

   i) Write use of print_r ( )

   j) What is role of $_GET in php ?

2. Attempt **any two** of the following : **(2×5=10)**

   a) Explain how to use constructor and destructor to initialize and cleanup your object with suitable example.

   b) Explain functions fread ( ), fwrite ( ),

      fgetc ( ), fgetS ( ) which are used for reading and writting file.

   c) Write a php program to convert temperature farhenite to celcius using sticky form.

3. Attempt **any two** of the following : **(2×5=10)**

   a) Write a php program to accept 4 digit year, a month (1 – 12) and start day of month and return number of working days (Monday-Friday) in a given month.

   b) Write a regular expression that extracts the domain name portion of web URL eg. http://www.example.Com (Here example. Com is domain name)

      Write a php script to accept URL and print domain name.

   c) Write a php program for the following create a calculator & class that can store two values and operations add, subtract multiply add using specific request.

      ```
      Enter No 1 : [          ]

      Enter No 2 : [          ]

      O Add O Subtract O Multiply O Divide
      [Submit]
      ```

4. Attempt **any one (A** or **B) :** **(10)**

   A) i) Write a php script that uses cookies to remember how long ago a visitor first visited the page. Display value of the page visit in minutes and seconds.

      (Hint : used time ( ) to find time of cookies). **5**

      ii) What is sticky form ? Explain it with suitable example. **5**

                   OR

   B) i) Write a php program for the following create tables Format emp (no., name, designation) and dept (dno, name) which are present is a file empdata.txt. Read it and print it in tabular format. **5**

      ii) Write short note on session. **5**

   _____

Seat
No.

T.Y. B.Sc. (Computer Science) (Semester – IV) Examination, 2014
CS – 341 : SYSTEMS PROGRAMMING AND OPERATING SYSTEMS – II (Paper – I)
(2008 Pattern)

Time : 2 Hours   Max. Marks : 40

Instructions : 1) **Neat** diagram must be drawn **wherever** necessary.
  2) Figures to the **right** indicates **full** marks.
  3) **All** questions are **compulsory**.

1. Attempt **all** of the following.   **(10×1=10)**
   a) Define the two types of multiprocessors.
   b) What is cascading termination of processes ?
   c) Define compaction.
   d) Give the two types of semaphore.
   e) Define logical address space.
   f) What is segmentation ?
   g) What do you mean by mutual exclusion ?
   h) Give four implementations of free space list.
   i) Define the term : Independent process.
   j) What is TLB miss ?

2. Attempt **any two** of the following.   **(2×5=10)**
   a) Explain with the help of queuing diagram, how the processes are scheduled ?
   b) Explain the contiguous allocation method with diagram.
   c) Consider the following set of processes with the length of CPU burst time and arrival time in milliseconds.

Process	Burst time	Arrival time
P1	5	1.5
P2	1	0
P3	2	2
P4	4	3

   Illustrate the execution of these processes using pre-emptive SJF and FCFS CPU scheduling algorithm.

   Calculate average waiting time and average turnaround time.

   Give the contents of Gantt chart.

P.T.O.

3. Attempt **any two** of the following. **(2×5=10)**
   a) Consider the following segment table :

Segment	Base	Length
0	363	500
1	1272	20
2	1675	1500
3	985	240
4	211	130

   What is the physical address of the following logical address ?

   i) 0,425   ii) 2,500   iii) 1,150

   iv) 3,285   v) 4,125.

   b) What is deadlock ? Explain deadlock recovery in details.

   c) What do you mean by dual mode operation of OS ? Explain with neat diagram.

4. Attempt **any one** (**A** or **B**) : **(1×10=10)**

   A) i) Construct the resource allocation graph for the following set of process (P), Resource (R) and Edge (E)

   P = {P1, P2, P3, P4}

   R = {R1, R2, R3, R4, R5}

   E = {P1→ R1, P2→R3, P2→R5, R4→P3, P3→R5, P4→R2,

   R5→P4, R1→P2, R2→P1}

   Convert it into wait for graph. **5**

   ii) What is internal and external fragmentation ? What are the various ways to avoid external fragmentation ? **3**

   iii) What do you mean by Roll-out and Roll-in ? **2**

   OR

   B. i) Consider the following page reference string :

   1, 2, 3, 4, 2, 1, 5, 6, 2, 1, 2, 3, 7, 6, 3, 2, 1, 2, 3, 6.

   How many page faults would occur for the following page replacement algorithm.

   a) FIFO page replacement

   b) LRU page replacement.

   Assume three frames. **5**

   ii) Write a short note on "Medium term scheduler". **3**

   iii) Explain the race condition in detail. **2**

   _____

Seat
No.

T.Y. B.Sc. (Semester – IV) Examination, 2014
Computer Science (Paper – III)
CS-343 : COMPUTER NETWORKS – II
(2008 Pattern)

Time : 2 Hours   Max. Marks : 40

Instructions : 1) ***All*** questions are ***compulsory***.
2) ***All*** questions carry ***equal*** marks.
3) ***Neat*** diagrams must be drawn ***wherever*** necessary.
4) Black figures to the ***right*** indicate ***full*** marks.

1. Attempt **all** of the following. **(10×1=10)**

   a) Define the terms : ad hoc network and infrastructure network.

   b) State any two goals in the designing of network layer services.

   c) What is a role of pseudoheader in the UDP checksum calculation ?

   d) Why proxy ARP technique is used ? Define proxy ARP.

   e) Define : Active Hubs. Also state use of Active Hubs.

   f) What do you mean by cipher ?

   g) List different types of transmission modes used by FTP to transfer a file across the data connection.

   h) Change the following IPV4 addresses from binary notation to dotted-decimal notation.

      • 10000001 00001011 00001011 11101111

      • 11000001 10000011 00011011 11111111

   i) Define : CGI (Common Gateway Interface)

   j) State one line difference between Substitution ciphers and Transposition ciphers.

2. Attempt **any two** of the following. **(2×5=10)**

   a) State the responsibility of routing algorithm. Explain nonadaptive and adaptive classes of routing algorithms.

   b) Write a note on stream delivery service of TCP.

   c) What do you mean by address resolution ? Explain recursive and iterative resolution.

3. Attempt **any two** of the following. **(2×5=10)**

   a) Explain the fields related to fragmentation in IPV4 protocol.

   b) Write a note on Java Applet Security.

   c) Explain different attributes used to assign membership in VLAN.

4. Attempt **any one** (A or B) of the following.

   A) i) Explain the different fields of UDP datagram. **4**

      ii) What is RRSets ? Explain several new record types introduced by DNSsec. **4**

      iii) State different rules used for assigning IP address blocks. **2**

   B) i) Write a note on different types of user agents. **4**

      ii) Discuss different issues while connecting different LANS using bridges. **4**

      iii) State different cases in which the services of ARP can be used. **2**

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Seat No.

T.Y. B.Sc. (Semester – IV) Examination, 2014
COMPUTER SCIENCE (Paper – IV)
CS-344 : Web Development and Php Programming – II
(2008 Pattern)

Time : 2 Hours   Max. Marks : 40

Instructions : *1)* ***All*** *questions are* ***compulsory****.*
               2) Figures to the ***right*** *indicate* ***full*** *marks.*
               3) ***All*** *questions carry* ***equal*** *marks.*

1. Attempt **all** of the following :   **(10×1=10)**

   a) What is sequence in php ?

   b) Find the output

   $q = $db $\rightarrow$ query ("select * from emp");

   if (DB : : iserror ($q))

      {

   die ($q $\rightarrow$ getMessage ( ));

      }

   else

      var-dump ($q);

   c) What function might you use to draw an arc ?

   d) What function would you use to output your GIF after building it ?

   e) Write any two applications of XML.

   f) Which protocols are used to retreive mail from the server ?

   g) List any two features of HTTP protocols.

   h) Give any two applications of Ajax.

   i) Which protocol is used to describe and locate web services ?

   j) Give names of XML Parser.

2. Attempt **any two** of the following :   **(2×5=10)**

   a) What are different class methods and object methods available in Pear DB Library ? Explain any two methods.

   b) Draw a picture of a smiling face and save this picture as "face.gif ".

   c) What is DOM ? How does it relate to XML ?

P.T.O.

3. Attempt **any two** of the following : **(2×5=10)**

   a) Write a php script to read Account. XML file which contains Account-No, name, address, branch, Account type, balance. Print Account details of specific branch in tabular format after accepting branch as input.

   b) Explain how message can be send on Email Server ?

   c) Hall-booking (booking-id, date, Time, duration, eventname) customer (cust-id, booking-id, name, phoneno)

   Write a php script to print report of all booking details on given date.

4. Attempt **any one (A or B) :** **(2×5=10)**

   A) i) Write a note on Ajax php frame work.

   ii) Write a note on SoAp.

   B) i) Write an Ajax program to display list of games stored in an array on clicking ok button.

   ii) Explain working of web services and give any two advantages of web services.

   —————————

T.Y. B.Sc. (Semester – IV) Examination, 2014
COMPUTER SCIENCE (Paper – V)
CS – 345 : Programming in Java – II
(2008 Pattern)

Time : 2 Hours   Max. Marks : 40

Instructions : 1) **All** questions are **compulsory**.
2) **Neat** diagrams must be drawn **wherever** necessary.
3) Black figures to the **right** indicate **full** marks.

1. Attempt **all** of the following :   **(10×1=10)**

   a) Write a statement to create colour class object.

   b) Name the methods used for interthread communication.

   c) What is the purpose of class. For Name () method ?

   d) What is main difference between Iterater and List Iterator ?

   e) Name the method to get all values of a parameter passed from html to servlet.

   f) What is scriplet ?

   g) List any two well known port numbers.

   h) What is JavaBean ?

   i) List any two methods for creating transaction.

   j) Write a method to redirect servlet to another html or servlet.

2. Attempt **any two** of the following :   **(2×5=10)**

   a) Write a program to accept employee information as (id, name). Store it into Hashtable. Display only names of all employees.

   b) Write a program to store all available fonts in Jcombo Box. Display 'Hello World' string on frame. Apply selected font for displayed string.

   c) Explain thread life cycle with the help of diagram.

3. Attempt **any two** of the following :   **(2×5=10)**

   a) What is the purpose of implicit objects ? Explain any two implicit objects in JSP.

   b) How cookies are important in web application ? Explain methods for creating and accessing cookies.

   c) Design an HTML containing four check boxes as Drawing, Singing, Reading, Drama. Display the selected hobbies using servlet.

4. Attempt **any one** (either **A** or **B**) of the following : **(1×10=10)**

  A) i) Create a thread for moving "Welcome to Java" text from top to bottom. **4**

    ii) What is Inet Address Class ? Explain any two methods of Inet Address Class. **4**

    iii) What is wrong in following piece of code ? Justify your answer. **2**

        < % = request. SetAttribute ("user", "admin"); % >

<div align="center">OR</div>

  B) i) List any four types of JDBC drivers. Explain any 2 types of drivers. **4**

    ii) How JSP is different than servlet ? **4**

  C) What is the output of following program. **2**

```
import java. util.*;
public class test
{
    public static void main (string [ ] arg)
    {
        TreeSet t = new TreeSet ();
          t.add ("D");
          t.add ("V");
          t.add ("S");
          t.add ("B");
          System .out.println (t);
          System.out.println (t.size ());
    }
}
```

<div align="center">—————————</div>

Seat
No.

F.Y. B.Sc. (Computer Science) Examination, 2014
ELECTRONICS (Paper – I)
Electronic Devices, Circuits and Computer Peripherals
(2008 Pattern)

Time : 3 Hours   Max. Marks : 80

Instructions : 1) **All** the questions are **compulsory**.
 2) **Use** of non-programmable electronic calculator is **allowed**.
 3) Draw **neat** diagram **wherever** necessary.
 4) Figures to the **right** indicate **full** marks.

1. Attempt the following questions :   **(8×2=16)**

   a) Draw the symbols of
      i) Zener diode
      ii) Rectifier diode.

   b) State different configurations of BJT. Which one of them is widely used as amplifier ?

   c) In JFET circuit ΔI_D = 5 mA and ΔV_{GS} = 1V. Determine the value of transconductance.

   d) State the conditions of Barkhausien criteria for sustained oscillations.

   e) Give statement of Thevenin's theorem.

   f) State the types of keyswitches used in keyboard.

   g) Draw the circuit diagram for OPAmp as an integrator.

   h) Draw the block diagram of regulated power supply.

2. Attempt **any four** of the following :   **(4×4=16)**

   a) Explain the working principle of optocoupler.

   b) Explain Enhancement mode of DE MOSFET.

   c) Using Thevenin's theorem find current through RL in the following circuit.
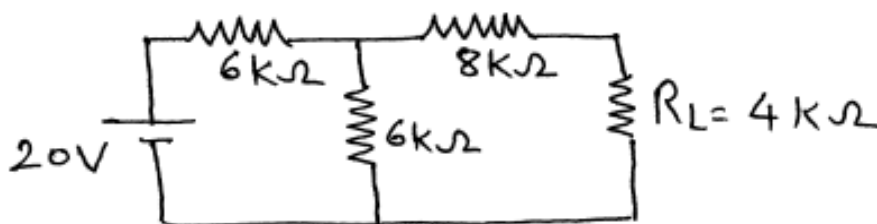
                                                                                                P.T.O.

d) Explain the classification of transistor amplifier based on frequency range.

e) Draw the circuit diagram for OPAmp as subtractor. Derive an expression for its output voltage.

f) Explain working principle of flat bed scanner.
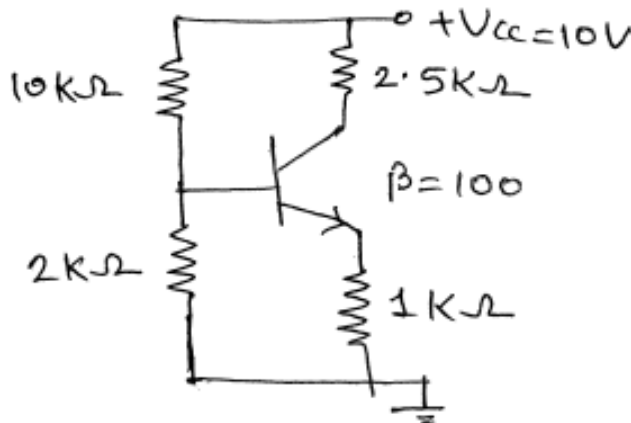
3. Attempt **any four** of the following : (4×4=16)

a) Draw the circuit diagram of Hartley oscillator and explain its working in brief.

b) Give the ideal values of OPAmp characteristics (any four).

c) What is α and β of transistor ? If $\alpha = 0.96$, $I_B = 0.01$ MA find β and I_C.

d) i) Give statement of super position theorem.

   ii) Find the voltage across each resistor in the following circuit.
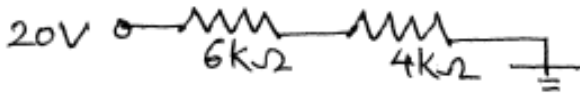
e) Draw the circuit diagram of Half wave rectifier and explain.

f) Explain the working of Dot Matrix Printer.

4. Attempt **any two** of the following : (2×8=16)

a) i) State types of seven segment display and explain any one in detail.

   ii) Explain the working of NPN transistor.

b) i) State the components of CDROM drive and explain the working of CDROM drive.

   ii) Differentiate between FET and BJT.

c) i) Draw the circuit diagram of phase shift oscillator and explain its working.

   ii) State any four components of pendrive. Give function of any two components.

d) i) Draw the d.c. load line for the given circuit :

ii) Define following parameters of FET.

    1) D.C. drain resistance

    2) Transconductance

   3) Amplification factor.

    State relation between them.

5. Attempt **any one** of the following :   **(1×16=16)**

  a) i) Draw the block diagram of online and off line UPS and explain.

    ii) Explain working principle of Inkjet printer with suitable block diagram.

  b) i) 1) Explain working principle of optical mouse.

      2) Define line and load regulation. In a regulated power supply if V_{NL} = 5.2V, V_{FL} = 4.95 V. Find % load regulation.

    ii) Identify the configurations of OPAmp and find the output voltages.

3)

4)

_____
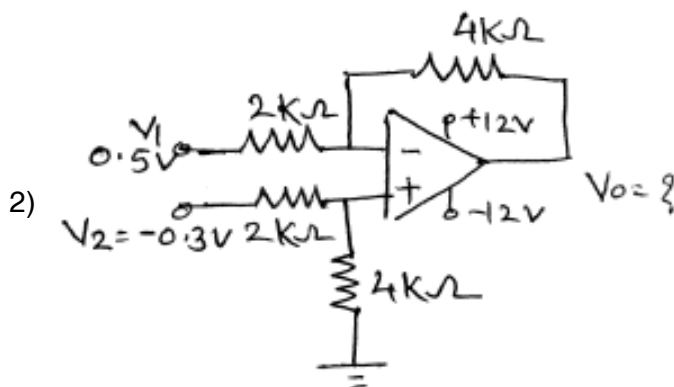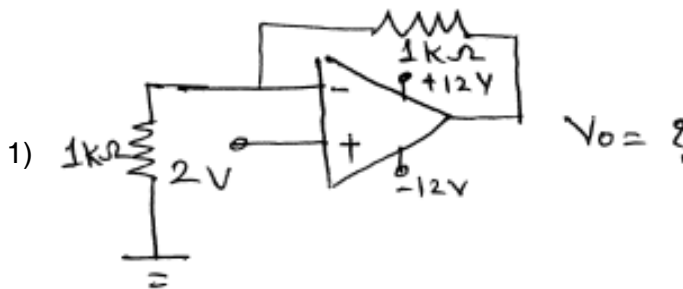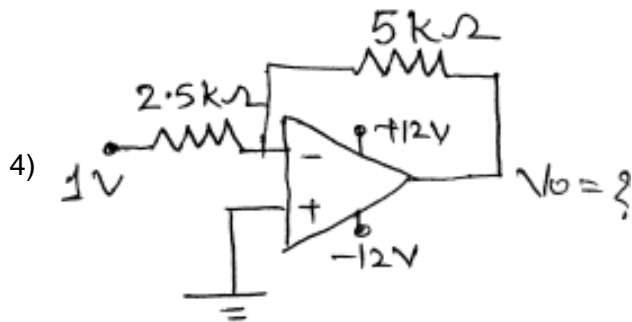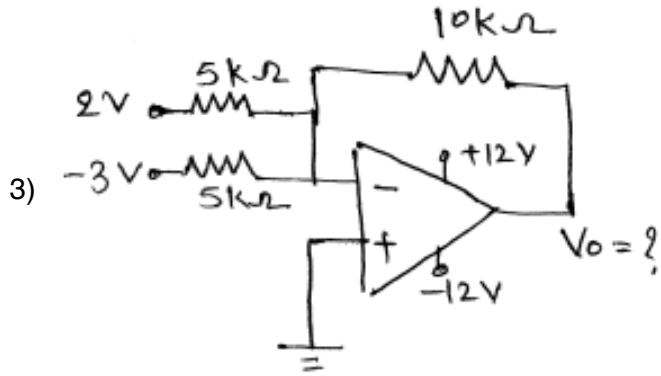
| Seat |
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F.Y. B.Sc. (Computer Science) Examination, 2014
ELECTRONICS (Paper – II)
Fundamentals of Digital Electronics
(2008 Pattern)

Time : 3 Hours   Max. Marks : 80

***Instructions** : 1) **All** questions are **compulsory**.*
*2) Figures to the **right** indicate **full** marks.*
*3) **Neat** diagrams must be drawn **wherever** necessary.*

1. Attempt **all** of the following : **(8×2=16)**

   a) State Demorgan's theorems.

   b) What is the maximum positive and maximum negative number if the 'n' bit signed binary number is represented in 2'S complement format ?

   c) Draw logic diagram of Half adder.

   d) Calculate pulse width of a monostable multivibrator if external timing resistor $R = 10k\Omega$ and capacitor $C = 1\mu F$

   e) Find number of flip-flops required for five bit up counter.

   f) Give full form of EPROM and SRAM.

   g) Define resolution of DAC.

   h) What do you mean by Assembler ?

2. Attempt **any four** of the following : **(4×4 =16)**

   a) Perform the following conversions
      i) $(52)_{10} = (?)$ Excess-3
      ii) (00011) Gray $= (?)_2$
      iii) $(00101011)_2 = (?)_{16}$
      iv) $(634)_{10} = (?)_{BCD}$

   b) Draw neat logic diagram and explain the working of 4 bit parallel adder.

   c) With neat logic diagram, explain the operation of clocked SR flip-flop using NAND gates.

   d) What are drawbacks of machine level language programming ?

   e) Explain working principle of PROM.

   f) Construct AND and NOT gates using NOR gates only.

3. Attempt **any four** of the following : **(4×4 =16)**

   a) With neat circuit diagram, explain operation of crystal clock using inverters.

   b) What is the output of 4 bit R-2R DAC if the digital input is 1001. Assume Logic 1 = V_{ref} logic 0 = OV.

P.T.O.

c) Perform following subtraction using 2's complement method.

$(11010)_2 - (10000)_2$

d) Simplify the following using Boolean Algebra.

$$\overline{A}\,\overline{B}\,\overline{C} + \overline{A}B\overline{C} + \overline{A}BC$$

e) Explain in brief, what do you mean by ALU ?

f) Differentiate RISC and CISC processor.

4. Attempt **any two** of the following : **(2×8 =16)**

a) With neat logic diagram explain 8 : 1 multiplexer using NAND gates only.

b) Draw and explain logic diagram of 4 bit serial in - parallel out shift register with proper timing diagram.

c) Explain the working of 3 bit flash ADC using proper circuit diagram.

d) Draw and explain the working of astable multivibrator using IC 555.

5. Attempt **any one** of the following : **(1×16 =16)**

a) I) i) Simplify the following expression using K-map

$$Y = \overline{A}\,\overline{B}\,\overline{C}\,\overline{D} + \overline{A}B\,\overline{C}D + AB\,\overline{C}\,\overline{D} + AB\,\overline{C}D + A\,\overline{B}\,\overline{C}\,\overline{D} + \overline{A}\,\overline{B}\,\overline{C}\,\overline{D}$$

ii) Perform the following conversions

1) $(570)_8 = (\ ?\ )_{10}$

2) $(68.75)_{10} = (\ ?\ )_2$

3) $(010101010.01)_2 = (\ ?\ )_8$

4) $(312A)_{16} = (\ ?\ )_{10}$

II) i) Draw and explain decimal to BCD encoder.

ii) Compare SRAM and DRAM.

b) I) Construct following modulus counters using IC 7490

1) MOD 2 2) MOD 4 3) MOD 6 4) MOD 8

II) i) Calculate the number of address and data lines of the following

1) 256 x 8 2) 8 K x 4

ii) How many memory chips will be required to construct

1) 16 KB of memory with chips of 4 K x 8

2) 64 KB of memory with chips of 16 K x 4

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Seat
No.

F.Y. B.Sc. (Computer Science) Examination, 2014
STATISTICS (Paper – II)
Statistical Methods – II
(2008 Pattern)

Time : 3 Hours   Max. Marks : 80

Note : i) *All* questions are *compulsory*.
   ii) *Figures* to the *right* indicate *full* marks.
   iii) *Use* of single memory non-programmable scientific calculators and statistical tables is *allowed*.
   iv) *Symbols* have their usual meanings unless *otherwise* stated.

1. Attempt **all** of the following questions :   **(8×2=16)**

   a) Define the following terms :
      i) Mutually exclusive events
      ii) Exhaustive events.

   b) Let A and B be two events defined on Ω, such that P(A) = 0.7, P(B) = 0.5 and $P(A \cap B) = 0.3$
      Find,
      i) $P(A' \cap B)$ ii) $P(A \cup B)$.

   c) Define independence of 2 events.

   d) 10 out of 25 employees are graduates. If 4 employees are selected at random from those 25 employees, what is the probability that there are exactly 3 graduates ?

   e) State additive property of Poisson distribution.

   f) For a continuous random variable if $E(X) = \frac{3}{5}$ find the value of E(5X + 4).

   g) Let $X \rightarrow B(n, p)$. If $E(X) = \frac{5}{3}$, $V(X) = \frac{10}{9}$ find the value of p.

   h) State mean and variance of Pareto distribution with parameter α.

2. Attempt **any four** of the following :   **(4×4=16)**

   a) 2 fair dice are rolled simultaneously. Find the probability that
      i) sum of the numbers is not more than 4.
      ii) product of the numbers is atleast 20.

   b) Define conditional probability of an event with an illustration. Also state the theorem of compound probability.

c) A card is drawn from a pack of 52 playing cards. What is the probability that ?
   i) it is a king or a spade card
   ii) it is a red or black coloured card.

d) A and B are 2 events defined on Ω such that $P(A) = \frac{1}{4}$, $P(B \mid A) = \frac{1}{2}$ and $P(A \mid B) = \frac{1}{4}$
   i) Show that A and B are independent
   ii) Find $P(A' \cap B')$.

e) Explain the following terms with one illustration each :
   i) Non deterministic experiment
   ii) Sample space.

f) Let A_1 A_2 and A_3 be 3 events defined on a sample space Ω such that

   $P(A_1) = P(A_2) = P(A_3) = \frac{1}{3}$, $P(B \mid A_1) = \frac{2}{7}$, $P(B \mid A_2) = \frac{4}{9}$, $P(B \mid A_3) = \frac{1}{5}$. Find $P(A_1 \mid B)$.

3. Attempt **any four** of the following : **(4×4=16)**
   a) Define expectation and variance of a discrete random variable.

   b) A randar system has a probability of 0.3 of detecting a certain target in a single scan. Find the probability that in 4 scans
      i) Exactly 2 targets are detected
      ii) Almost 1 target is detected.

   c) Define Geometric distribution. State its mean and variance. Give one real life situation where Geometric distribution is used.

   d) A car coming off the production line can have number of defects according to the following probability distribution
      Number of defects(X)   : 0   1   2   3   4
            P(X = x)   : 0.2   0.2   0.3   0.2   0.1
      i) Find the cumulative distribution function of X
      ii) Find $P(X \le 3)$.

   e) If X and Y are independent Poisson variables with means 2 and 4 respectively, then find $P(X + Y \ge 1)$.

   f) Define Binomial distribution. Also state its mean and variance.

4. Attempt **any four** of the following : **(4×4=16)**
   a) Define cumulative distribution function of a continuous random variable. Also state its any 2 properties.

   b) Life time of a battery follows Exponential distribution with mean 300 hours. What is the probability that such a battery will last for ?
      i) More than 350 hours
      ii) Less than 200 hours.

   c) Define continuous Uniform distribution. State its mean and variance. Give one real life situation where uniform distribution is used.

d) Let X be a continuous random variable with probability density function given by

$$f(x) = \begin{cases} \dfrac{3}{2}x^2, & -1 \le x \le 1 \\ 0, & \text{o.w.} \end{cases}$$

Find :
   i) E(X)   ii) E(2X + 1).

e) Define Normal distribution. If $X \to N(\mu, \sigma^2)$ then identify the distribution of AX + B where A and B are constants.

f) The mean yield per plot of a crop is 19 kgs. with a standard deviation of 4 kgs. If the distribution of yield per plot is normal, find the probability that the yield of plot is between 16 kgs and 20 kgs.

5. Attempt **any four** of the following :   **(4×4=16)**

a) To determine the attitude about prayers in public schools, a survey was conducted in a particular school.

	Gender	
Attitude	**Girls**	**Boys**
Favoured	62	38
Opposed	49	51

Is the attitude towards prayers independent of gender at 5% l.o.s. ?

b) Define the following terms :
   i) Type I error   ii) Type II error
   iii) Null hypothesis   iv) Critical region.

c) State advantages and disadvantages of simulation.

d) A machine is designed to produce insulating washers for electrical devices of average thickness 0.02 cms. A random sample of 12 washers was found to have average thickness of 0.035 cms with a standard deviation of 0.01 cms. Is the machine designed properly ?
($\alpha = 0.01$)

e) Describe the test procedure for testing $H_0 : P = P_0$ against $H_1 : P \ne P_0$ at α % l.o.s.

f) The following data gives the number of hours that a rechargeable hedge trimmer operates before recharge is required :

1.7, 2.1, 0.9, 1.3, 2.0, 1.7, 2.2, 1.1, 1.9

Use sign test to test whether median time required in hours is 1.8 at 5% l.o.s.

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